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ANNUAL REPORT

OF THE

BOARD OF HEALTH

OF THE

HEALTH DEPARTMENT OF THE CITY OF NEW YORK

FOR THE

YEAR ENDING DECEMBER 31, 1896.

NEW YORK:
THE MARTIN B. BROWN COMPANY, PRINTERS AND STATIONERS.
Nos. 49-57 PARK PLACE.

1897.

YORK
RY

BOARD OF HEALTH.

DECEMBER 31, 1896.

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Attorney and Counsel:

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ef Inspector of Contagious Diseases,
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Chief Inspector of Foods, Offensive Trades and Mercantile Establishments,
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MARY IRELAND, ... *Inspector of Mercantile Establishments.*
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WALTER BENSEL, M. D.,	*Medical Inspector.*

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FRANCIS J. MORAN,	"
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PHILIP H. HISS, JR., M. D.,	" "
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MAGGIE KAIGHIN, .	*Laundress* (Help).
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RADY, ... "
E WOODS, ... "
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STEWART, ... "
E BARRIE, ... "
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ASTERSON, ... *Waitress.*

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ANNIE WEIR, ... "
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DAVID QUINN, ... "

◆

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ES KRELL, ... *Fireman.*

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CHARLES JOHNSON, . . . "

HEALTH DEPARTMENT.

REPORT FOR THE YEAR ENDING DECEMBER 31, 1896.

HEALTH DEPARTMENT,
CENTRE, ELM, WHITE AND FRANKLIN STREETS,
CRIMINAL COURT BUILDING,
NEW YORK, March 22, 1897.

on. WILLIAM L. STRONG,
Mayor of the City of New York:

SIR—In accordance with the provisions of section 533 of the New ork City Consolidation Act, the Commissioners of Health have the onor to present this their Report of the operations of the Board of ealth of the Health Department of the City of New York for the year nding December 31, 1896. Under the provisions of the Consolidation ct, the organization of the Health Department is divided into two ureaus, namely, the Sanitary Bureau and the Bureau of Records.

THE SANITARY BUREAU.

The Sanitary Bureau is under the charge of the Sanitary Superin-endent, who, as its chief executive officer, is charged with the general upervision of the sanitary work of the Department, the enforcement of e provisions of the several sections of the Sanitary Code, and the laws nd ordinances relating to tenement and lodging houses, and generally e laws of the State relating to the Health Department of the City of ew York. This Bureau is divided into five divisions, as follows:

First Division—General and Special Sanitary Inspection.

Second Division—Contagious Diseases and Medical Sanitary Inspection.

Third Division—Food Inspection, Offensive Trades and Mercantile stablishments.

Fourth Division—Pathology and Bacteriology.

Fifth Division—Medical School Inspection.

THE BUREAU OF RECORDS.

This Bureau is in charge of the Register of Records, and is intrusted ith the registration of births, marriages and deaths, the granting of burial ermits, the study of topographical causes of disease and circumstances f unusual deaths, and, incidentally, the classification and filing of vital tatistics.

HOSPITALS.

There are also three hospitals under the charge of the Board of Health, amely: The Willard Parker Hospital, the Reception Hospital and the

Riverside Hospital (North Brother Island), which are devoted to the reception and care of those suffering from contagious diseases.

PUBLIC HEALTH.

The state of the public health during the year has been eminently satisfactory. The number of deaths reported was only 41,622, against 43,420 during 1895.

The 41,622 deaths represent a death-rate of 21.52, against 23.11 for 1895, and is the lowest in the history of the city. The following table gives the estimated population, deaths and death-rates for the past ten years:

YEAR.	ESTIMATED POPULATION.	TOTAL NUMBER OF DEATHS.	DEATH-RATE.	YEAR.	ESTIMATED POPULATION.	TOTAL NUMBER OF DEATHS.	DEATH-RATE.
1886	1,437,170	37,351	25.90	1892	1,708,124	44,329	25.95
1887	1,479,143	38,933	26.32	1893	1,758,010	44,486	25.30
1888	1,522,341	40,175	26.39	1894	1,809,353	41,175	22.76
1889	1,566,801	39,679	25.32	1895	1,879,195	43,420	23.11
1890	1,612,559	40,103	24.87	1896	1,934,077	41,622	21.52
1891	1,659,654	43,659	26.31				

The year 1895 closed the third decade since the organization of the Health Department. The change in the sanitary administration of the City in 1866 was directly due to the alarm caused by the increasing death-rate of the city and the apprehension of an invasion of cholera. It is interesting to note the effect of this change, as shown by the lowering of the death-rate through successive decades:

YEARS.	MEAN POPULATION.	AVERAGE ANNUAL NUMBER OF DEATHS.	DEATH-RATE.	YEARS.	MEAN POPULATION.	AVERAGE ANNUAL NUMBER OF DEATHS.	DEATH-RATE.
1856–1865.	749,292	24,118	32.19	1876–1885 ..	1,230,436	32,392	26.32
1866–1875.	924,824	27,535	29.77	1886–1895 ..	1,641,535	41,331	25.18

The decrease of the last decade has been chiefly during the last three or four years, as will be seen on referring to the ten-year table above.

The following comparative table for 1895 and 1896 comprises about two-thirds of all the deaths for the year, and includes most of those whose prevalence is believed to be controllable by proper sanitary supervision:

CAUSE OF DEATH.	DEATHS.		INCREASE IN 1896.	DECREASE IN 1896.
	1895.	1896.		
Influenza	567	101	...	466
Small-pox	10	1	...	9
Measles	793	714	...	79
Scarlet fever	468	402	...	66
Diphtheria and croup	1,976	1,763	...	213
Whooping-cough	496	435	...	61
Typhoid fever	322	297	...	25
Malarial fever	90	112	22	...
Cerebro spinal meningitis	204	178	...	26
Diarrheal diseases	3,208	2,874	...	334
Heart diseases	2,297	2,396	99	...
Bronchitis	1,920	1,477	...	443

CAUSE OF DEATH.	DEATHS.		INCREASE IN 1896.	DECREASE IN 1896.
	1895.	1896.		
Pneumonia	5,751	5,383	...	368
Phthisis	5,205	4,994	...	211
Bright's disease and nephritis	2,519	2,685	166	...
Sunstroke	85	765	680	...
Accidents	1,960	1,876	...	84
Suicides	376	384	8	...
Homicides	76	71	...	5
All others	15,097	14,714	...	383
Totals	43,420	41,622	975	2,773

It appears from this table that there has been a saving of 1,798 lives of persons who would have died of some of these detailed causes, if the mortality from them had been as high in 1896 as in 1895.

The most remarkable item in the above table is the extraordinary and altogether unprecedented number of deaths from sunstroke, viz., 765, or 680 more than the number in 1895. The largest number of deaths from this cause ever previously recorded in this city was 320 in 1872, and again in 1892. In 1866 there were 310. With these exceptions, the number has never risen as high as 200 but four times since the records were first made up in 1804, viz., 211 in 1853, 238 in 1870, 206 in 1876, and 216 in 1887.

It will be of interest here to compare the three extremely hot periods of 1872, 1892 and 1896, as hardly anything can better indicate the sanitary condition of the city than the number of deaths during three periods, and the ages and causes of death in those who succumbed. The following table will admit of such a comparison :

DATE.			MAXIMUM TEMPERATURE.			DEATHS REPORTED DAILY.			DEATHS REPORTED WEEKLY.		
1872.	1892.	1896.	1872.	1892.	1896.	1872.	1892.	1896.	1872.	1892.	1896.
			Degrees	Degrees	Degrees						
June 23	July 17	Aug. 2	83	76	82	115	158	78	769	1,081	809
" 24	" 18	" 3	73	82	86	102	149	112			
" 25	" 19	" 4	67	80	90	133	154	139			
" 26	" 20	" 5	74	83	94	96	164	108			
" 27	" 21	" 6	78	82	92	105	138	109			
" 28	" 22	" 7	88	86	97	117	151	131			
" 29	" 23	" 8	90	89	95	101	167	132			
June 30	July 24	Aug. 9	96	89	98	149	179	146	1,569	1,434	1,810
July 1	" 25	" 10	96	93	94	184	190	129			
" 2	" 26	" 11	97	96	96	210	187	240			
" 3	" 27	" 12	94	91	93	302	171	335			
" 4	" 28	" 13	95	97	90	267	198	374			
" 5	" 29	" 14	89	97	81	236	223	321			
" 6	" 30	" 15	87	86	86	221	286	265			
July 7	July 31	Aug. 16	87	74	85	170	302	127	1,056	1,181	822
" 8	Aug. 1	" 17	83	79	77	150	210	124			
" 9	" 2	" 18	84	73	75	157	159	151			
" 10	" 3	" 19	87	83	72	150	125	114			
" 11	" 4	" 20	89	88	72	162	107	92			
" 12	" 5	" 21	84	81	75	130	125	108			
" 13	" 6	" 22	83	85	72	137	153	106			

It will be observed that the week preceding the week of greatest mortality was a week of very moderate temperature in 1872 and 1892, while in 1896 there were five days when the temperature rose to 90 degrees or upward. Notwithstanding this continued high temperature, however, the mortality for the week was low, only 809 deaths having been reported. In the week of the highest mortality there were five days in each year in which the temperature rose to 90 degrees or more, the average of the maximum temperature being 93.4 degrees in 1872, 92.7 degrees in 1892 and 91 degrees in 1896; and the mean temperature for the week being, in 1872, 83.7 degrees; in 1892, 82.9 degrees, and in 1896, 84.2 degrees, the very high mean of 1896 being due to the fact that the nights were very warm, adding very materially to the oppressiveness of the heat. The week of the greatest mortality in 1896 was, therefore, not only a week of very high temperatures, fairly comparable with those of 1872 and 1892, but was even more oppressive, and was itself preceded by a week of very high temperature, the average of the maximum temperatures for the preceding week having been, in 1872, 79 degrees; in 1892, 82.6 degrees, and in 1896, 90.9 degrees, and the mean temperature having been, in 1872, 72.6 degrees; in 1892, 71.7 degrees, and in 1896, 82.2 degrees.

The mean temperature of the hot week of 1896 having been so high and that of the preceding week so much higher than in 1872 or 1892, it is very remarkable that the mortality should have increased so slowly. In 1872 there were six successive days on which the temperature rose to 90 degrees or more, and the greatest number of deaths reported was on the fifth day; in 1892 there were five successive days with a maximum temperature of 90 degrees or more, and the greatest number of deaths was reported on the seventh day from the first; in 1896 there were ten days when the maximum temperature reached 90 degrees or upward, and the greatest number of deaths was reported on the tenth day, while as soon as the hot spell came to an end, the mortality immediately dropped to the normal number, the deaths reported for the succeeding week having been only 822.

The figures which are given in the preceding table represent the reported mortality, *i. e.*, the number of certificates of death presented daily at the burial permit office. The actual number of deaths occurring each day has been ascertained for the hot week alone of each year, and is given in the following table:

DATE.			ACTUAL NO. OF DEATHS DAILY.			DEATHS FROM SUNSTROKE.		
1872.	1892.	1896.	1872.	1892.	1896.	1872.	1892.	1896.
June 30......	July 24.......	August 9.....	191	175	233	7	..	62
July 1.......	" 25.......	" 10.....	247	177	325	34	2	133
" 2.......	" 26.......	" 11.....	351	199	386	68	6	181
" 3.......	" 27.......	" 12.....	238	201	313	43	16	151
" 4.......	" 28.......	" 13.....	227	285	234	44	50	86
" 5.......	" 29.......	" 14.....	184	350	177	12	106	47
" 6.......	" 30.......	" 15.....	153	228	113	4	51	11
			1,591	1,615	1,781	212	231	671

It will be seen that in each week the greatest number of deaths for day coincides with the greatest number of deaths from sunstroke, , on comparing this table with the previous one, it will be seen that in 2 the greatest mortality was on the fourth day of extreme heat, in 2 it was on the fifth day, and in 1896 it was on the eighth day.

In 1872 and 1892 the period of extreme heat was entirely included in week named in the last preceding table, but this week comprised only -half of the hot period of 1896, and it will be of interest to observe the y gradual increase of the actual mortality for the first five days of the spell, as follows:

DATE.	ACTUAL DEATHS.	SUNSTROKES.	DATE.	ACTUAL DEATHS.	SUNSTROKES.
ust 3..........	98	..	August 7.........	122	3
4..........	120	1	" 8.........	172	22
5..........	137	3			
6..........	139	6	Total.......	788	35

This table clearly shows that the continued high temperature did not preciably affect the mortality until the fifth day of its continuance.

This apparent increase of stamina in the community, enabling it to ist the cumulative effect of an extremely high temperature for so many ys, can hardly be accounted for in any other way than by an improvent in the sanitary environment or in personal hygiene. There has doubtedly been some improvement in the latter. More attention has en paid to it by people in general, and their habits are better as regards d, drink and cleanliness. A considerable proportion of the cases of istrokes are due to a combination of alcoholism and high temperature, d the slow development of such cases in 1892 and 1896, as compared th 1872, would seem to indicate a more general caution in the use of oholic stimulants in such weather.

Most of the improvement, however, seems to be caused by a better iitary condition of the city. If this is so, it ought to be evident in a nparison of the proportion of deaths of small children during the hot ather, the deaths of nursing infants being generally recognized as one he best tests of the sanitary condition of a community. The following le shows the number of deaths of children under one year of age, and number of deaths of such children from diarrheal diseases, as compared h the total number of deaths during the three hot weeks:

YEAR.	TOTAL DEATHS.	DEATHS UNDER 1 YEAR.	DIARRHEAL DEATHS UNDER 1 YEAR.	PERCENTAGE OF DEATHS UNDER 1 YEAR ON TOTAL.	PERCENTAGE OF DIARRHEAL DEATHS UNDER 1 YEAR ON TOTAL UNDER 1 YEAR.
....	1,569	733	495	46.7	67.5
....	1,434	563	293	39.3	52.0
....	1,810	391	128	21.6	32.7

The proportion of deaths of nursing infants to the total number of deaths during the hot weather is thus shown to be less than half in 1896 of what it was in 1872, and of the deaths that did occur the proportion dying from diarrheal diseases was also in 1896 less than half that in 1872, the improvement shown being much greater between 1892 and 1896 than between 1872 and 1892, indicating again, in another way, the same conclusion previously arrived at, viz., that the most marked improvement in the sanitary condition of the city has occurred within the last few years.

CONTAGIOUS AND INFECTIOUS DISEASES.

The same thing is shown in the case of diseases of a contagious or infectious nature. These diseases are more strictly preventable than any others, and it is in their control and prevention that sanitary science finds its principles most thoroughly justified. Of this class of diseases, measles is the most evasive of preventive measures, and is everywhere the most difficult to manage, probably because of the somewhat prolonged period of invasion, during which others may be infected by persons who are not suspected of having the disease. The improvement in the management of these diseases is shown by the following table :

Deaths.

	1888.	1889.	1890.	1891.	1892.	1893.	1894.	1895.	1896.
Smallpox	81	1	2	2	81	102	154	10	1
Measles	591	470	730	663	864	393	584	793	714
Scarlet Fever	1,361	1,242	408	1,220	977	551	541	463	402
Diphtheria and Croup	2,553	2,291	1,783	1,970	2,106	2,558	2,870	1,976	1,763
Typhoid Fever	364	397	352	384	400	381	326	322	297
Typhus Fever	4	......	......	1	45	200	......	......	......
	4,954	4,401	3,275	4,240	4,473	4,185	4,475	3,560	3,177

Death Rates.

	1888.	1889.	1890.	1891.	1892.	1893.	1894.	1895.	1896.
Smallpox	.05	.0006	.001	.001	.05	.06	.085	.005	.0005
Measles	.39	.30	.45	.40	.51	.22	.32	.42	.37
Scarlet Fever	.89	.79	.23	.74	.57	.31	.30	.25	.21
Diphtheria and Croup	1.68	1.45	1.11	1.19	1.23	1.45	1.59	1.05	.91
Typhoid Fever	.24	.25	.22	.23	.23	.22	.18	.17	.15
Typhus Fever	.003	......	......	.0006	.03	.11	......	......	......
	3.25	2.81	2.03	2.55	2.62	2.38	2.47	1.90	1.64

In the years 1893 and 1894 diphtheria increased in almost all the large cities of this country and Europe, and seemed almost impossible to control. The introduction of a new method of treatment, however, in the latter year, put a new aspect on the matter, and its successful application in 1895 and 1896, here and elsewhere, gives assurance that this disease will at last be shorn of its terrors. The steady decrease in the actual as well as the relative number of deaths from typhoid fever, is probably due partly to the careful watch maintained over the milk supply of the city, and partly to the greater attention paid to the sanitation and water supply urban resorts of late years. The cases of this disease that do occur ily cannot be due to a contamination of the Croton water supply, such a contingency the disease would undoubtedly attain the prons of an epidemic.

DIARRHEAL DISEASES.

e of the surest tests of the sanitary condition of a city is the relaevalence of diarrheal diseases. Being caused, as they generally y some impurity of the food or water habitually used by the tants, their frequency and fatality constitute an excellent indication wisdom and vigor with which sanitary ordinances are promulgated forced. In this city there has been a progressive decrease, much rated in recent years, not only in the relative but in the absolute r of deaths from these diseases, as shown in the following table:

Year.	Population.	Total Deaths.	Deaths from Diarrheal Diseases.	Death-rate from Diarrheal Diseases.	Percentage of Deaths from Diarrheal Diseases on Total Number.
	1,280,857	37,924	4,050	3.16	10.68
	1,318,264	34,011	3,398	2.58	9.99
	1,356,764	35,034	3,679	2.71	10.51
	1,396,388	35,682	3,426	2.45	9.60
	1,437,170	37,351	3,494	2.43	9.35
	1,479,143	38,933	3,762	2.54	9.66
	1,522,341	40,175	3,489	2.29	8.68
	1,565,801	39,679	3,648	2.33	9.19
	1,612,559	40,103	3,346	2.08	8.34
	1,659,654	43,659	3,587	2.16	8.22
	1,708,124	44,329	3,602	2.11	8.13
	1,758,010	44,486	3,310	1.88	7.44
	1,809,353	41,175	3,040	1.68	7.38
	1,879,195	43,420	3,208	1.71	7.39
	1,934,077	41,622	2,874	1.49	6.90

THE EFFECT OF CLEAN STREETS.

e cleanliness of the streets during the past year is an object lesson residents of the densely populated parts of the city, and more ion to the cleanliness of their apartments is the result. The proper ng of the city streets is so intimately connected with the other matlating to the sanitary condition of the city, that an investigation en made during the past year as to the effect of improved methods et cleaning upon the public health. It is evident that the problem resented for solution is not of a simple nature. In estimating the of cleaner streets, the general benefit derived from improved sani-, due to the efforts of this Department, must also be considered, as s the greater possibilities of cleanliness afforded by the use of t as a street pavement in many localities. A few of the facts already ained are given here.

trying to determine whether the improved condition of the streets roduced any perceptible effect upon the health of the city, it was that a comparison must be made, not with former years (for a lower lity might be due to many other causes than cleaner streets), but the same year, as far as possible. It seemed probable that if such iness were to effect the mortality directly, such effect would be more evident in the dirtiest localities, and therefore it was determined to make a comparison of the death-rates from certain diseases which are generally considered to be a test of sanitary conditions, in certain localities where the streets were always filthy, and in the remainder of the city. It was possible that such a comparison might show a greater difference in the filthiest places.

Accordingly, in the following tables, the First, Fourth and Fourteenth Wards were selected, as being occupied by the filthiest class of people and having the highest death-rates of any part of the city.

For separate comparison, the Tenth, Eleventh, Thirteenth and Seventeenth Wards were also taken, as being very much overcrowded, and also having notoriously filthy streets. The deaths from diarrheal diseases were chosen for one comparative table, the only one selected for reproduction in this place. The deaths for each quarter of the years 1895 and 1896 were then compared with the deaths in the same localities during the previous ten years, the annual average being increased to correspond with the increase of population.

The following table gives the figures upon which the percentages are based for the third, or summer, quarter of each year:

	1st, 4th and 14th Wards.				10th, 11th, 13th and 17th Wards.				Remainder of City.			
	Annual average 1885–1894.	Same increased for population.	1895.	1896.	Annual average 1885–1894.	Same increased for population.	1895.	1896.	Annual average 1885–1894.	Same increased for population.	1895.	1896.
July to Sept., inc..	113.2	115	112	91	424.5	457	404	293	1,927.2	2,136	1,871	1,509

The following table shows the percentage of increase or decrease in the number of deaths from diarrheal diseases in each of the districts named, as compared with the annual average for the previous ten years:

	1st, 4th and 14th Wards.		10th, 11th, 13th and 17th Wards.		Remainder of City.	
	1895.	1896.	1895.	1896.	1895.	1896.
July to Sept., inc..........	—2.6	—20.9	—11.6	—35.9	—12.4	—29.4

It will be seen that the improvement from 1895 to 1896, so far as indicated by this table, was much the greatest in the filthiest wards, and was the least in the remaining portion of the city, after the dirtiest wards had been eliminated.

BIRTHS.

The total number of births during the year was 55,623, against 53,731 in 1895. Of the total number, 30,284, or 54.44 per cent. were reported by physicians, and 25,339, or 45.56 per cent. by midwives. It will be seen that there has been a gradual increase from year to year in the proportion reported by physicians, it having been 50.48 in 1892, 52.31 in 1893, 53.55 in 1894, and 53.76 in 1895. Of the total number of births, 28,244 were males and 27,379 were females, the proportion being 1.032 males to every female, against 1.054 in 1895. There were 419 pairs of twins reported, or one in every 133 births.

MARRIAGES.

The total number of marriages reported was 20,513, against 20,612 in 1895, representing a marriage rate of 21.8 persons married per 1,000 living, which is considered an unusually high marriage rate.

HOSPITALS.

The hospitals under the control of the Department, namely, those located near the foot of East Sixteenth street, and at North Brother Island, opposite East One Hundred and Thirty-eighth street, are devoted to the care and treatment of contagious diseases. In the Willard Parker Hospital and its annex cases of diphtheria and scarlet fever in children are treated, adults being, as a rule, sent to North Brother Island. The following table shows somewhat in detail the work of this hospital during the year:

Willard Parker Hospital.

	CASES TREATED.			DEATHS.		
	Males.	Females.	Total.	Males.	Females.	Total.
Scarlet fever	190	231	421	14	26	40
Diphtheria	418	442	860	105	100	205
Total	608	673	1,281	119	126	245

The Reception Hospital, as its name implies, receives, temporarily, patients who are sick with contagious diseases until they are removed to the Riverside Hospital at North Brother Island. Here are also received suspicious cases which it is not considered safe to allow to remain in their homes on account of the difficulty of isolation and the consequent danger to others. The work of this hospital is indicated by the following table:

Reception Hospital.

	MALES.	FEMALES.	MOTHERS ACCOMPANYING.	TOTAL.	DEATHS.
1894	815	547	211	1,573	36
1895	419	392	52	863	48
1896	405	374	14	793	38

At the Riverside Hospital, situated on North Brother Island, are treated all cases of contagious and infectious diseases that are not retained at the Willard Parker Hospital. The following table shows the variety of diseases and the number of cases of each treated here during the past year:

Riverside Hospital.

	Cases Treated.			Deaths.		
	Male.	Female.	Total.	Male.	Female.	Total.
Smallpox	7	....	7	1	....	1
Typhus fever	1	1	2	....	....	....
Scarlet fever	22	24	46	1	1	2
Scarlet fever, with measles	3	10	13	2	2	4
Scarlet fever, with whooping-cough	1	....	1	....	....	....
Scarlet fever, with chicken-pox	3	7	10	....	....	....
Scarlet fever, with diphtheria	27	33	60	8	12	20
Scarlet fever, with diphtheria and parotitis	....	1	1	....	....	....
Measles	197	162	359	19	25	44
Measles, with diphtheria	24	11	45	12	4	16
Diphtheria	....	1	1	....	....	....
Diphtheria, with whooping-cough	12	10	22	1	1	2
Diphtheria, with whooping-cough and scarlet fever	1	....	1	....	....	....
Leprosy	7	....	7	2	....	2
Under observation	....	2	2	....	....	....
Total	305	262	567	46	45	91

In making a comparison between the results of treatment in the hospitals of this Department, as compared with the cases treated at their homes, it should be remembered that the cases removed to the hospitals are generally the more severe ones ; that they are more apt to come from places with unsanitary surroundings and with systems poorly nourished, and, therefore, unable to battle against disease ; that the diphtheria cases are too far advanced for the best results to be obtained from the antitoxin treatment, and that the cases of scarlet fever and measles at the Riverside Hospital are frequently brought there with grave complications already existing.

VACCINATION.

During the year the corps of physicians known as Inspectors of Vaccination, men charged with the specific duty of offering by house-to-house visitation vaccination to all persons needing it, and who are also authorized to visit the schools for the purpose of examining and vaccinating such pupils as are not protected by a former vaccination, performed the following work :

Primary vaccinations	21,340
Secondary vaccinations	61,481
Total number of vaccinations	82,821

SUMMER CORPS.

Under the provisions of section 4, chapter 504, of the Laws of 1879, the Board of Estimate and Apportionment is required to appropriate each year the sum of $10,000, to be known as the "Tenement-house Fund," to be placed to the credit of the Health Department, and by it expended in the employment of a special corps of physicians, whose duty it shall be to visit every tenement-house, especially in the poorer and more crowded districts of the city, prescribe for the helpless sick, to give needful advice, distribute rules for the care of infants and to cause to be corrected all unsanitary conditions.

On June 23, 1896, 50 physicians were appointed for service (as in preceding years), during the months of July and August, and the city was divided into 50 districts, to each of which one physician was assigned for duty.

The following tabulated statement shows in detail the work of this corps during the past year:

Number of visits to tenement-houses	30,601
Number of visits to families	274,742
Number of sick treated	37,460
Number of minor nuisances abated by personal effort	4,057
Number of complaints of nuisances forwarded	539
Number of circulars for infants distributed	81,517
Number of tickets to the St. John's Guild excursions distributed	15,887
Prescriptions filled at Central Office	291
Number of revisits additional made to the sick	4,429
Number of patients found under treatment by other doctors	5,405
Number of days of service	2,159

DIVISION OF PATHOLOGY, BACTERIOLOGY AND DISINFECTION.

The work of the Division in the bacteriological diagnosis in cases of suspected diphtheria has been carried on with entire success during the year, along the lines previously established, and exhibits a considerable increase, as compared with that of 1895. The following table shows the great increase of this branch of the work of the Division since its establishment in 1893:

	1893. (From May 6.)	1894.	1895.	1896.
Total cultures examined; daily average.	14.6	36.1	63.0	69.6
Cultures made for diagnosis (primary); total examined.	2,775	7,609	9,526	10,293
Cultures made after convalescence (later); total examined.	1,332	5,637	1,098	13,113
Cultures made from healthy throats in infected families (trial); total examined	....	....	2,344	1,643

The number of "culture stations" throughout the city has been increased to a total of 74. Some 21 of these are visited daily by employees of the Department, for the purpose of collecting cultures in cases of suspected diphtheria, samples of sputum, etc., left by physicians or Department Inspectors, and of furnishing the stations with any needed supplies. Arrangements are made with the remaining stations to forward any culture, etc., received during the day to some one of the stations visited daily, at an hour just previous to that at which the collector reaches the station. In this way cultures, etc., left by physicians or Inspectors at any of the stations before 3.30 P. M. on week days and before 2.45 P. M. on Sundays and holidays reach the laboratory on the evening of the same day, and are examined the following morning. At many of the stations, cultures, etc., are collected at hours later than those mentioned above, and this fact will be indicated during the coming year on the list of stations issued from time to time, for general distribution.

In connection with the routine work mentioned above, a series of investigations was made during the early part of the year, for the purpose of confirming the results of previous experience as to the virulence of bacilli morphologically identical with the Klebs-Loeffler bacillus, when found by ordinary routine bacteriological examination in cultures from the throats of individuals presenting clinically the symptoms of simple acute angina only. The bacilli found in such cultures were tested upon guinea pigs as to virulence in the usual manner, and the subsequent history of the cases was obtained from the attending physicians by the Medical Inspectors of the Division.

The results of these investigations entirely confirmed those of previous experience, *i. e.*, that simple anginas in which morphologically typical diphtheria bacilli are found by the ordinary routine methods of examination should be included under the name diphtheria, without reference to the site, extent or intensity of the inflammatory process, or to the character of the exudate.

In addition to the above, careful notes were made during April of the clinical and bacteriological diganosis in every case of suspected diphtheria from which cultures were received and examined in the bacteriological laboratory. During this period 107 cases regarded as diphtheria by the attending physicians, and so reported to the Department, were found to be false through the examination of cultures made later by Inspectors of the Department, while during the same period only 80 cases regarded by the attending physicians as false diphtheria, or as of a doubtful nature, and so reported, were found, on bacteriological examination, to be true diphtheria. These data would seem to effectually dispose of the statement, so constantly made and reiterated, that as the result of the general adoption in this city of bacteriological examinations for the diagnosis of diphtheria, the number of cases of this disease has been largely increased (and the death-rate thus proportionately lowered) by the addition of many cases of tonsillitis and pharyngitis, which were previously regarded as simple anginas.

Increase in Working Force.

To keep pace with the constantly increasing demands made upon the Division, in routine bacteriological work, and especially in experimental investigations with reference to the prevention, diagnosis and treatment of infectious diseases, an increase in the staff was again found necessary. Accordingly, four additional Assistant Bacteriologists were appointed in November, 1896. An additional Laboratory Attendant and Collector was also appointed earlier in the year.

Production and Administration of Diphtheria Antitoxic Serum.

As a direct result of the successful experiments with regard to the rapid production of strong diphtheria toxin, to which allusion was made in the report of 1895, antitoxic serum of a strength much greater than any hitherto thought possible has been regularly produced since the early part of the year. The highest grade of serum now produced in this Department contains 500 antitoxin units (Behring's standard) in one cubic centimeter. The use of the more concentrated preparations has greatly reduced the disagreeable sequellæ (rashes, joint pains, etc.,) which were occasionally met with when weaker serums were employed, and which are due to the horses' blood serum in which the antitoxin is dissolved, and not to the latter *per se.* Much is gained, also, in the reduction of the bulk of liquid necessary to be injected in order that a given number of antitoxin units may be administered.

The use of antitoxin in the treatment of diphtheria has increased greatly in this city during the year. Some 87 druggists throughout the city now act as agents for its sale and free distribution. The majority of these establishments also serve as "culture stations." It has been found necessary to specially detail an employee of this Department to the constant supervision of these establishments, in order that their supplies of antitoxin, culture tubes, etc., may be always ample for all demands and in good condition.

The free administration of antitoxin, either through the Medical Inspectors of the Division, or by physicians in cases where payment for the remedy would be a hardship, has been carried on with gratifying success. The remarkable reduction of the death-rate and actual mortality from diphtheria in this and other cities where antitoxin has been extensively employed, together with the results in the use of the remedy reported by the Inspectors of this Division, by physicians throughout the city, and through the collective investigations of a very large number of observers, both in this country and abroad, afford an absolute demonstration of the specific value of antitoxic serum in the treatment of diphtheria, and have completely verified the prediction in this respect, made in the annual report for the year 1894. In view of the above, the position of this Department, as a pioneer among sanitary authorities in the production and administration of diphtheria antitoxin, is specially gratifying, and affords ample compensation for the time, labor and money, expended in the inauguration, development and maintenance of the work.

Production of Bovine Vaccine Virus. New Vaccine Laboratory.

In the report for 1895 reference was made to the investigations begun in that year with relation to the improvement of the vaccine virus produced by this Department. These investigations were conducted under the supervision of the Director of the Bacteriological Laboratories, and have been continued during the present year with most successful results. A detailed experimental investigation has been made into all the methods employed in various parts of the world for the production and preservation of vaccine virus. The choice and care of animals, the places, methods and virus most suitable for inoculation, the time and manner of collection, and the preparation and preservation of the virus after collection, have all been carefully studied. The most notable vaccine laboratories in Europe and in this country have been visited and their practice noted. As a result, many important changes have been made, the methods formerly in use having been entirely revolutionized. The virus is now issued in the form of a glycerinated vaccine pulp, contained either in capillary tubes for single vaccinations, or in small vials of convenient size, holding pulp sufficient for ten and fifty vaccinations, respectively. Calves are now employed in the place of cows or heifers. The greatest care is taken to insure cleanliness in the production and preservation of the virus, all instruments and receptacles being sterilized, and the operations of inoculation and collection made as nearly aseptic as possible. Before the virus from any animal is issued, the animal is sent to autopsy and the organs carefully examined for any evidence of disease. In addition, the virus is subjected to bacteriological examination and to clinical test. As a result of all the above, the vaccine virus now produced by this Department is unexcelled, whether in potency, in keeping qualities, or in freedom from bacteria, by that produced in any other laboratory throughout the world. These facts have been fully established by an extended series of most careful tests, and it is believed that no virus is more fully tested, as a matter of routine, before being used, than that now produced by this Department.

In order to afford the most complete facilities for the production of vaccine virus of the high grade described above, contracts have been made for the construction of a new vaccine laboratory. The building for this purpose will be located in the immediate vicinity of the Hospital Bacteriological Laboratory, on the land owned by the Department at the foot of East Sixteenth street, in this city. It is believed that, in construction and equipment, this laboratory will be the equal of any now existing in this country or abroad.

Sanitary Supervision of Tuberculosis.

The work of the Division in this respect has been successfully prosecuted during the year along the lines previously established. With few exceptions, the various public institutions throughout the city have been prompt in reporting cases of tuberculosis coming under their observation, and a very decided increase in the number of private cases reported by physicians has also occurred. A corresponding increase in the number of samples of sputum received for microscopic examination has taken place. The following table exhibits more fully the above facts :

	1894. (From Mar. 2).	1895.	1896.
Samples of sputum examined—			
Daily average	1.7	3.1	5.1
Total	511	1,147	1,856
Cases of tuberculosis reported—			
By physicians	278	514	985
By public institutions	3,985	5,310	7.349

The following table shows the total number of cases of tuberculosis reported to the Department, by months, since the inception of this work in March, 1894:

Cases of Tuberculosis Reported During—	1894.	1895.	1896.	Cases of Tuberculosis Reported During—	1894.	1895.	1896.
January	....	541	524	August	357	455	673
February	....	332	402	September	368	408	762
March	378	448	862	October	363	477	582
April	466	612	936	November	496	494	595
May	331	467	841	December	491	466	669
June	649	589	833				
July	364	535	655	Total	4,263	5,824	8,334

The large increase in the number of specimens of sputum received uring 1896 is probably due, at least in part, to a circular regarding the nportance of bacteriological examinations in the early diagnosis of pulionary tuberculosis, prepared by the Director of the Bacteriological aboratories, and first issued by order of the Board in the latter part of 895. This circular was widely distributed among the physicians of the ity during 1896. It is as follows:

"The symptoms of incipient pulmonary tuberculosis are few, not marked and not uniform. hey are frequently not sufficient in number or importance to attract the attention of the affected dividual, and their significance is often not recognized by physicians, as there are other conditions hich closely resemble incipient pulmonary tuberculosis.

"Tuberculosis results from the reception into a susceptible system of tubercle bacilli. These e usually drawn in with the air inspired, and find lodgment in some portion of the respiratory ssages. There they increase in number, when conditions favorable for their multiplication ist, and by their growth set up an inflammation which becomes evident in the formation of new sues, the so-called tubercle. The inflammatory changes are usually at first very slight and the fects entirely local. Moreover, in this early stage there is a marked tendency to a localization d restriction of the process and to an entire recovery. Many persons get well untreated. In ch cases the tubercles are gradually replaced by fibrous tissue, and the bacilli die or are rendered rmless. At this time, *i.e.*, when a patient has tuberculosis, but when the disease is confined to a nall, sharply circumscribed area, there is the best opportunity for successful treatment.

"On the other hand, in a large percentage of the unrecognized and neglected cases, recovery oes not take place, but the tubercular process extends; new tubercles form, the old ones become ecrotic, and there is a coalescence of separate foci of infection, forming larger areas of disease, ll a great part of one or both lungs is affected. At the same time, the bacilli in their growth rm poisons which are absorbed by the system, and in the diseased or necrotic tissues other bacteria re deposited, producing the so-called mixed infection.

"The disease has now assumed a far more serious aspect, is easily recognizable and contitutes what is commonly called consumption. With few exceptions, this progresses to a fatal ermination. The classical symptoms commonly assigned to early tuberculosis, *i.e.*, persistent ough with expectoration, loss of appetite and weight, hæmoptysis, are really signs, in most instances, ot of the incipient affection, but of the advanced disease. In the early stage, a positive diagnosis s possible only when tubercle bacilli are found in the expectoration. It is an impression commonly held that the bacilli are not found unless the disease has advanced to a point at which the signs presented on a physical examination are themselves almost conclusive. Such, however, is not the case; bacilli are not infrequently found in the expectoration when the physical signs are indicative only of a slight bronchitis, or when there are absolutely no physical signs obtainable. When signs of consolidation are present, the affected area is always considerable, and always far greater than would be inferred from the evidences obtained on examination. It is, therefore, of supreme importance that the diagnosis should be made at the earliest possible moment. The expectoration should be examined early, and if bacilli are not found immediately, should be examined repeatedly in every case of doubtful diagnosis. All cases, also, in which there is a cough, with or without expectoration, persisting for more than a few weeks, and all cases in which there is unexplained pallor, loss of appetite, languor or loss of weight (general debility), even if the cough appears to be almost entirely absent, should be considered cases of doubtful diagnosis, and bacilli should be sought for in the expectoration.

"In conclusion, emphasis should be laid upon the following clearly demonstrated facts:

"First—Incipient tuberculosis tends to recovery.

"Second—Advanced tuberculosis, with or without mixed infection, tends to a fatal issue.

"Third—In all coughs which last more than a few weeks, tuberculosis is to be suspected as a cause.

"Fourth—Successful treatment and prophylaxis demand the earliest possible diagnosis.

"Fifth—The positive diagnosis of incipient pulmonary tuberculosis properly so called is possible only when tubercle bacilli are found in the expectoration.

"Sixth—Repeated examinations of the expectoration are frequently necessary to demonstrate the presence of the tubercle bacilli in incipient cases of pulmonary tuberculosis."

A table has been prepared showing the weekly deaths in this city from pulmonary tuberculosis during 1896, as compared with the average for the previous years, the latter increased to correspond with the increase of population. This table exhibits a decided decrease in the number of deaths for 1896, and affords a gratifying indication of the value of the work carried on during the past three years by this Department in the sanitary supervision of tuberculosis.

The following table exhibits the mortality from pulmonary tuberculosis by age, from 1890 to 1896, inclusive. The large number of deaths from this disease occurring during the working years of life is specially noticable. The slow but fairly steady decrease in the number of deaths from year to year is also shown:

Deaths from Phthisis, by Age, from 1890 *to* 1896, *Inclusive.*

YEAR.	UNDER 15 YEARS.	15–25.	25–35.	35–45.	45 AND UPWARD.	TOTAL.
1890	243	1,001	1,686	1,223	1,339	5,492
1891	210	970	1,606	1,145	1,229	5,160
1892	253	945	1,523	1,112	1,200	5,033
1893	259	1,043	1,555	1,041	1,226	5,124
1894	210	886	1,471	1,026	1,065	4,658
1895	239	970	1,652	1,163	1,181	5,205
1896	200	965	1,557	1,141	1,131	4,994

A rapid reduction in the tubercular death-rate cannot, in the nature of things, be anticipated. It is certain, however, that progress in this respect must be along the lines laid down by this Department for the prosecution of its work. These are, first, education of the public regarding the infectious character of pulmonary tuberculosis, involving the precautions necessary to prevent its spread; and, second, the thorough renovation of the infected premises.

An investigation of the records of this disease kept during the past three years, and more especially of the map of the city, upon which cases of and deaths from tuberculosis have been plotted during this period, has afforded striking evidence regarding the communicable character of this disease. Its segregation in certain houses, and the sequence of cases therein, is of special interest, as bearing upon the work of this Department in the renovation of infected premises. The details of this investigation will be found in a special report included in that of the Pathologist and Director of the Bateriological Laboratories.

In connection with the routine examination of samples of sputum from suspected cases of tuberculosis, experimental investigations have been carried on during the year and are now in progress, with regard to the pathogenic activity of bacteria, other than the bacillus tuberculosis, found in sputum. This involves the isolation and detailed study of such bacteria. These investigations are carried on with a view to secure the fullest possible information obtainable from a bacteriological standpoint, regarding any case of suspected tuberculosis from which a sample of sputum is sent for examination.

The time appears to be rapidly approaching when measures, more active than those now in force, may be properly inaugurated with a view to more efficiently control the spread of tuberculosis in this city. Having in mind its paramount duty as a conservator of the public health, this Department cannot fail to recognize the fact that, while pulmonary tuberlosis is a communicable, and therefore preventable, disease, it is not gally so declared in the Sanitary Code, and that the Department is erefore unable, until after amendments are made to its Sanitary Code, t only to compel its registration in common with other infectious dis- ses, but to properly care for sufferers from the disease (whose helpless- ss or ignorance make them potent factors in the spread of infection). he problem presented is undoubtedly difficult of solution, and no step ould be taken without the most careful consideration ; but that definite tion must soon be taken cannot be controverted.

In taking such action, the Department will not only be fulfilling its ain duty, but it is believed that this will meet with the approbation of e public at large, and of the best element of the medical profession in is city.

Prevention of Spitting in Public Places.

In the early part of 1896, a report was presented to this Board by rs. T. Mitchell Prudden, Consulting Pathologist, and Hermann M. iggs, Director of the Bacteriological Laboratories. This report called ttention to the continual danger of transmission of infectious diseases in ublic places through the expectoration of persons suffering with different rms of infectious diseases of the throat and lungs, and offered specific ecommendations for adoption by the Board, directed toward the sup- ression of this nuisance.

After due consideration, the following section, based upon the recom- nendations submitted, was adopted by the Board in May, 1896, and nserted in the Sanitary Code :

Section 222. Spitting upon the floors of public buildings and of railroad cars and of ferry-boats, s hereby forbidden, and officers in charge or control of all such buildings, cars and boats shall eep posted permanently in each public building and in each railroad car and in each ferry-boat a fficient number of notices forbidding spitting upon the floors, and janitors of buildings, conductors f cars and employees upon ferry-boats shall call the attention of all violators of this ordinance to uch notices.

Notices have been posted and instructions to employees given. The good effects of these are already apparent in a marked diminution of the practice of public expectoration.

Production of Tetanus Antitoxic Serum.

Antitoxic serum of high grade for the treatment of cases of tetanus, preparation for which was made in 1895, is now produced by this Department. In common with the other products of the Department laboratories, the serum is furnished free of charge to any public institution in this city, and can be purchased by physicians at the main offices of the Department. A descriptive circular was prepared and issued in May, 1896. The exact value of this serum in the treatment of tetanus, and the best method of administration, have not been fully determined, the results so far reported being too few to afford a basis for reliable conclusions. The disease is comparatively rare, and some time must necessarily elapse before the value of tetanus antitoxin in its treatment can be accurately determined.

Production of Mallein and Tuberculin.

As a result of experiments successfully carried on during 1895 and the early part of the present year, mallein for use in the diagnosis of glandered horses, and tuberculin for similar use in suspected cases of tuberculosis in cattle or other animals, now form two of the products issued from the bacteriological laboratories of this Department. The value of these substances as efficient aids to clinical diagnosis in suspected cases of the diseases named, is well known, and requires no further comment.

Blood Test for the Diagnosis of Typhoid Fever.

Recent investigations made by Pfeiffer and Widal have shown that the blood of persons suffering from typhoid fever, when mixed with fresh cultures of the typhoid bacillus, has the power of arresting the active movement of these organisms, and of producing peculiar and characteristic agglutination or clumping of the bacilli. This reaction does not occur when the blood of typhoid patients is mixed with cultures of organisms other than the typhoid bacillus, nor does it occur with cultures of the typhoid bacillus when the blood of persons suffering from other diseases is employed. It has later been shown by Widal and Johnson that the reaction occurs equally well with specimens of dried blood, and can thus be employed practically for the diagnosis of typhoid fever in municipal laboratories. With a view to supplying as promptly as possible the data necessary to permit of a positive conclusion as to the exact value and limitations of this test, and especially for the purpose of determining the earliest period in any case of suspected typhoid fever at which a negative result may be considered as absolutely reliable, this Department has decided to examine specimens of blood from any case of suspected typhoid fever occurring in this city. A circular of information regarding the test, with directions for preparing the specimens of blood, has accordingly been issued and distributed. The "culture stations" throughout the city have been supplied with glass slides for the use of physicians in taking specimens, inclosed in suitable holders, and accompanied by blanks for a history of the case, to be filled out by the attending physician and forwarded with the specimen. These blanks include a temperature chart, thus enabling the attending physician to furnish information of special value for comparison with laboratory results. In the circular of information accompanying each outfit, special stress is laid upon the value of complete information with regard to every case from which specimens are forwarded, and physicians are particularly requested to send further specimens in any suspicious case with regard to which a negative result is reported. This work was undertaken in November, 1896. A considerable number of specimens has so far been received and examined, with results in the main confirmatory of those reported by the discoverers of the test. The data as yet available, however, are not sufficient to permit of definite conclusions as to the exact value and limitations of the test.

Experimental Investigations.

In addition to the investigations already mentioned as made with elation to diphtheria, vaccine virus, tuberculosis and typhoid fever, xperimental research in connection with the prevention, diagnosis, or reatment of infectious diseases has been carried on during the year along number of different lines. These are briefly as follows:

The production of typhoid antitoxic serum, for use in the treatment of he disease, for immunization against it, and for diagnostic purposes in he differentiation of the typhoid bacillus from allied organisms.

The production of cholera antitoxic serum, for uses as stated with egard to typhoid antitoxin.

The production of anti-streptococcus serum, for use in the treatment f diseases produced by this organism (septicæmia, streptococcus pneunonia, puerperal fever, etc.).

The production of a serum antitoxic to the toxin formed by the rowth and development of the bacterium coli-communis. To be used or diagnostic purposes, in differentiating this organism from allied acteria, and possibly for the treatment of appendicitis, peritonitis, etc., hen produced by the above bacillus.

The production of anti-pneumococcus serum, for possible use in the reatment of pneumonia.

Test of Ellsner's method for the differentiation of the typhoid bacillus from allied forms, more especially when occurring in water, fæces, etc.

Diagnosis of rabies in animals suspected of having the disease, and preparation of attenuated virus for its treatment.

Literature.

The following articles, written by members of the Division staff, have appeared during 1896:

HERMANN M. BIGGS, M. D., *Pathologist and Director of the Bacteriological Laboratories*, and ARTHUR R. GUERARD, M. D.—"The use of antitoxic serum in the treatment of diphtheria under the supervision of the New York City Health Department, with a resumé of the published reports on this subject." *New York Medical News*, December 12, 19, 26, 1896.

HERMANN M. BIGGS, M. D.—"The relative strength of diphtheria antitoxic serum." *London Lancet*, August 22, 1896.

HERMANN M. BIGGS, M. D.—"Some investigations as to the virulence of the diphtheria bacilli occasionally found in the throat secretions in cases presenting the clinical features of simple acute angina." *American Journal of Medical Science*, September, 1896.

WILLIAM H. PARK, M. D., *Assistant Director of the Hospital Bacteriological Laboratory*, and ANNA W. WILLIAMS, M. D., *Assistant Bacteriologist*—"The production of diphtheria toxin." *Journal of Experimental Medicine*, Vol. I., No. 1, 1896.

WILLIAM H. PARK, M. D.—"Diphtheria." System of Medicine, Loomis and Thompson. In press, December, 1896.

WILLIAM H. PARK, M. D.—"New facts upon the treatment of diphtheria." Hare's System of Therapeutics. In press, December, 1896.

J. S. BILLINGS, M. D., *Assistant Bacteriologist*—"The blood corpuscles in diphtheria, with special reference to the effect produced upon them by the antitoxin of diphtheria." *New York Medical Record*, April 25, 1896.

The following circulars, prepared under the supervision of the Director of the Bacteriological Laboratories, have been issued by the Department during 1896:

Relating to Diphtheria Antitoxin, February, 1896.
Relating to Tetanus Antitoxin, May, 1896.

Rules for Infant Feeding, August, 1896.

Use of Mallein for the Diagnosis of Glandered Horses, August, 1896.

Regarding the Blood Test for the Diagnosis of Typhoid Fever, November, 1896.

Regarding Glycerinated Vaccine Virus, as now prepared in the Laboratory of the New York Health Department, December, 1896.

New Disinfecting Apparatus.

The destruction of infection in articles, such as clothing, carpets, bedding, etc., whose character does not admit of efficient disinfection by the methods necessarily employed in infected premises, forms a most important branch of the work of this Department in the prevention of infectious diseases, and one whose magnitude constantly increases with the rapid increase of population in this city. In addition, no efficient method of disinfecting upholstered furniture, furs, velvets, or other costly fabrics, without serious injury to the same, has hitherto been available. In view of the above, it was decided to largely increase the capacity of the present steam disinfecting plant now in use at the Disinfecting Station of this Department and to erect in addition a plant for disinfection with formalin. Formalin has been found to be a better germicide than sulphurous acid gas, and is applicable to the efficient disinfection of upholstered furniture and costly fabrics, with at least a minimum of injury to these. During the summer, the Director of the Bacteriological Laboratories continued his investigations, begun some years since, of the most important disinfecting plants in England and on the Continent. On his return, active preparation was made for the erection, under his immediate supervision, of the new plant. The contract for the same has been given to the Sanitary Construction Company of this City, and the plant is now in course of erection. The following is a brief description of the same:

There will be substituted for the brick disinfecting chamber which has been in use some six years, two steam sterilizers, which together will have a capacity one and one-half times as great as the present chamber, the inside dimensions being, length, 8 feet, width, 6½ feet, height, 5½ feet. They are made of ¼-inch steel plate, flanged and riveted, strengthened by stay beams, and covered with non-conducting materials and wooden lagging.

The doors are of cast-iron frames and steel plates, lined with asbestos, and sealed to the chambers against rubber and canvas gaskets by "T" bolts and hand nuts. These doors are hung on cranes, avoiding the use of trolleys and trucks.

The cars for containing the goods are of wrought iron, securely braced and stayed, running on tracks on floor of chamber. At the ends of the cars are movable doors for convenience in loading, the sides being lined with canvas for preventing contact with hooks for hanging clothes, and with movable shelves for smaller articles.

The tracks outside each end of the chambers are arranged to be depressed when not in use and give room for swinging the doors.

Each sterilizer has large steam coils with direct boiler connection, insuring a high temperature when desired, moist steam pipes for continuous flow of current steam without pressure, air ejector for obtaining vacuum, and large pipes connecting with exterior steam-heating coil and fan for hot air blast. There are the necessary thermometers, vacuum and pressure gauges, safety and reducing valves and exhaust connecting pipes.

The operation of these various attachments to the sterlizing chambers provide for the following conditions to be secured:

Producing a vacuum in the chamber against 18 minutes of mercury. Producing and maintaining a current of free flowing steam so that every portion of the chamber and the goods are exposed to contact. A temperature of 220 degrees to be secured and maintained, or raised to a higher degree if needed. Steam pressure from one to six pounds per square inch to be secured and maintained in the chamber if required. A current of hot air to be put in circulation through the chamber, after the operation of disinfection is concluded, by means of a fan and steam radiating coils on the outside.

For the purpose of disinfection by formalin there is provided a wooden chamber, the interior dimensions of which are 7 feet long, 5 feet 6 inches high and 3 feet wide, constructed of narrow strips of white pine secured to door frames of yellow pine and joined by means of splines. This is again covered on the outside by transverse strips secured in a similar way. The doors at each end are secured against a rubber gasket by "T" bolts and hand nuts, similar to those of the steel sterilizing chambers. A gas generating tank of copper, 10 inches by 18 inches, having pressure gauge, water gauge and globe valve, is secured to the side of the formalin chamber and connected with the interior by means of brass pipes and flanges. Heat is applied to the bottom of this generator by means of a gas jet which liberates the gas until a pressure of 60 to 70 pounds is obtained, the gas then being released fills the interior of the chamber from which the air has previously been exhausted by the ejector.

When the necessary time for completing disinfection has elapsed, the ejector is again put in operation and the gas removed through the exhaust. The chamber is provided with a platform car upon which are placed articles to be disinfected, and is also provided with hooks on the interior for clothing and other articles.

Both the steel disinfecting chambers and the formalin chamber are set in a partition which divides the infected from the disinfected side of the disinfecting station, there being no communication excepting through the disinfecting chambers themselves.

The present boilers, steam radiator, fan and engine now in use at the Disinfecting Station are to be connected with the new apparatus and the whole rearranged to economize room and gain larger space for handling and storing goods.

The Engle Cremator, which has been for six years in active use, is to be partially relined.

SANITARY INSPECTION.

The several sections of the Sanitary Code are enforced by general orders of the Board, or, in extreme cases, by peremptory orders of the Sanitary Superintendent, or by and through the medium of the Sanitary Police.

For the purpose of special sanitary inspection, the city is divided into districts, one Inspector being detailed for work in each district, whose duty consists in the investigation and making of reports and recommendations to the Board upon citizens' complaints referred to him, and frequent inspection of and report upon special places which are likely to become dangerous to life or detrimental to health. Each Inspector is required to be thoroughly familiar with his district and, when time affords, to make a general inspection of the district; also to forward complaints of any sanitary defects he may discover. He is also required to reinspect premises upon which orders have been issued, to see that the same have been complied with.

A large amount of special work was performed by the Inspectors during the past year, all of which will be found in detail in the report of the Sanitary Superintendent.

The number of inspections and reinspections made by the Sanitary Inspectors was 137,224, resulting in 34,078 orders for the abatement of nuisances. The following premises and localities were inspected, reinspected and reported upon:

Tenement-houses	45,736	Dumps and dumping-grounds	117
Stores and warehouses	6,570	Schools	46
Lodging-houses	5,577	Miscellaneous	24
Private dwellings	4,220	Railroads and railroad cars	22
Other dwellings	2,638	Docks and piers	15
Sunken and vacant lots	1,885	Offensive trades	7
Stables	1,547		
Other buildings	1,197	Total	71,743
Manufactories and workshops	1,172	Reinspections	65,481
Slaughter-houses	534		
Public highways	331	Total	137,224
Receiving-basins and public sewers	96		
Public buildings	79		

Number of cellars ordered made water-tight	528
Number of privy-vaults ordered abolished	201

TENEMENT-HOUSE INSPECTION.

During the year one of the most important subjects which has engaged the attention of the Board has been the inspection of the tenement-houses of this city, and when it is understood that more than two-thirds of the people live in this class of houses it will not be surprising that the field for sanitary work is almost unlimited in extent and should yield good results.

A tenement-house, under the statute, includes every building or portion thereof which is rented, leased, let or hired out to be occupied as a house or residence of three or more families living independently and doing their cooking upon the premises, or by more than two families so living and cooking on any floor, and having a common right in the halls, stairways, yards, water-closets or some of them. Under the provisions of chapters 84 and 288 of the Laws of 1887 (amended in 1895) it became the duty of the Board of Health to inspect semi-annually all of this class of houses, and for the purpose of enforcing the provisions of this act and the several sections of the Sanitary Code relating thereto, the Board of Police has detailed to the service of the Board of Health 1 Sergeant, 2

Roundsmen and 47 Patrolmen (men of long experience in the Police Force of this city), who are known as the Sanitary Company of Police.

For the purpose of this inspection, the city is divided into 31 districts and a Sanitary Policeman assigned to make an inspection of each tenement-house within his district at least twice in each year, the first inspection commencing in the early part of January and the second in July. Each officer is provided with a memorandum book in which to enter the street and number of each house as inspected, and whether or not any cause for complaint exists. He is also instructed to secure by personal direction the abatement of all minor nuisances he may discover. In making the inspection, he is instructed to ascertain the following facts in connection with each house:

Street number.
Name and address of owner.
Number of families.
Number of occupants.
Overcrowding.
Halls, if lighted (Laws of 1895).
Privy accommodations—number of sittings.
Whether separately and independently connected with sewer.
Rags.
Schools.
Housekeeper on premises.
Cellars, if clean and dry.
Cellars, if fit for human habitation.
Yards, whether properly graded.
Yards, whether sewer connected.
Front and rear areas, whether graded.
Front and rear areas, whether sewer connected.
Waste-pipes, whether trapped.
Waste-pipes, whether joints are connected with cement or lead.
Waste-pipes, whether ventilated two feet above the roof.
Soil-pipes, whether trapped.
Soil-pipes, whether the joints are connected with cement or lead.
Stairs and balusters throughout the house.
Walls and ceilings of halls and rooms throughout the house.
Floors of rooms and halls throughout the house.
Slop-sinks, whether trapped and ventilated.
Wash-basins, whether trapped and trap ventilated.
Bath-tubs, whether trapped and trap ventilated.
Croton supply pipes.
Roof.
Skylights and roof ventilation.
Leaders.
Eaves-gutters.
Chimneys.
Fire-escapes, whether incumbered.
House drain, whether defective or earthenware.
Water-closets, whether trapped and trap ventilated.
Privy-vaults.
School sinks.
Privy-houses.
Cesspools.
Urinals, whether properly flushed.
Fences.
Hydrants in yard.
Air-shafts.
Ash and garbage receptacles, whether suitable, sufficient and clean.
Ash and garbage receptacles, whether kept within the stoop-line.

The total number of inspections and reinspections of this class of houses during the year was 190,134, resulting in 38,858 complaints upon which orders were issued.

This constant and almost daily inspection, and the enforcement of orders to remedy defects found to exist as to plumbing, drainage, cleanliness, ventilation, etc., have resulted in a material improvement of the sanitary condition of this class of houses. The semi-annual inspection made in the latter part of 1896, in accordance with the provisions of the Tenement-house Law, developed the fact that there were in this city—

Front houses	40,461
Rear houses	2,448
In all	42,909

Located as follows:

WARD.	Number of front houses.	Number of rear houses.	Total.	WARD.	Number of front houses.	Number of rear houses.	Total.
First	185	10	195	Fourteenth	579	148	727
Second	8	....	8	Fifteenth	447	34	481
Third	38	1	39	Sixteenth	1,371	146	1,517
Fourth	391	64	455	Seventeenth	2,571	313	2,884
Fifth	239	10	249	Eighteenth	1,220	69	1,289
Sixth	319	98	417	Nineteenth	5,452	67	5,519
Seventh	1,490	105	1,595	Twentieth	2,486	335	2,821
Eighth	802	99	901	Twenty-first	1,406	24	1,430
Ninth	1,579	112	1,691	Twenty-second	4,161	224	4,385
Tenth	1,056	177	1,233	Twenty-third	2,348	11	2,359
Eleventh	1,895	239	2,134	Twenty-fourth	242	2	244
Twelfth	9,195	23	9,218				
Thirteenth	981	137	1,118	Total	40,461	2,448	42,909

Occupied by 339,237 families, composed of—

Children under five years of age	180,359
Persons over five years of age	1,307,033
In all	1,487,392

Divided as follows:

WARD.	NUMBER OF FAMILIES.	PERSONS 5 YEARS OLD AND OVRR.	PERSONS UNDER 5 YEARS.	TOTAL POPULATION.
First	1,679	6,251	816	7,067
Second	32	173	15	188
Third	246	992	133	1,125
Fourth	3,472	16,010	1,510	17,520
Fifth	1,487	5,677	765	6,442
Sixth	3,760	17,949	1,757	19,706
Seventh	14,707	62,556	12,158	74,714
Eighth	4,994	19,902	2,731	22,633
Ninth	11,833	35,389	3,493	38,882
Tenth	13,959	66,425	14,049	80,474
Eleventh	17,519	67,665	14,747	82,412
Twelfth	75,361	276,184	34,103	310,287
Thirteenth	11,523	65,359	6,713	72,072
Fourteenth	6,097	28,999	3,260	32,259
Fifteenth	3,123	11,872	1,100	12,972
Sixteenth	9,583	37,203	3,406	40,609
Seventeenth	25,890	93,154	14,819	107,973
Eighteenth	9,752	34,115	4,729	38,844
Nineteenth	44,549	166,412	21,659	188,071
Twentieth	18,842	65,973	8,059	74,032
Twenty-first	10,137	42,625	4,192	46,817
Twenty-second	37,747	139,471	15,816	156,287
Twenty-third	12,177	43,479	8,675	52,154
Twenty-fourth	768	3,198	654	3,852
Total	339,237	1,307,033	180,359	1,487,392

During the year the Board found it necessary to issue orders, in accordance with the provisions of section 659 of the New York City Consolidation Act, for the vacation of 322 houses unfit for human habitation by reason of their sanitary condition and because of failure on the part of the owners thereof to comply with the orders of the Board issued for the purpose of remedying defects. In 264 of the cases, previous to the expiration of the notice for vacating, the owners complied with the orders of the Board and placed the premises in proper sanitary condition. In 58 cases the houses were vacated. Since vacation of these 58 houses, the orders have been complied with in 31. In 11 cases no work has been done; consequently these houses remain vacant.

In addition to the house-to-house inspection, the Sanitary Police are required to make night inspections of tenement-houses, to prevent overcrowding. Under the rules established by the Board of Health, the question of overcrowding has special reference to and should be understood to be such overcrowding as is dangerous or prejudicial to the health of the occupants. During the year, 45,601 night inspections were made, resulting in the issuing of 213 orders to reduce the number of occupants in over-crowded apartments.

CONDEMNATION OF BUILDINGS UNFIT FOR HUMAN HABITATION.

On May 9, 1895, section 659 of the New York City Consolidation Act was amended as follows:

"Sec. 659. Whenever it shall be certified to the board of health of the health department of the city of New York by the sanitary superintendent, that any building or any part thereof in the city of New York is infected with contagious disease, or by reason of want of repair has become dangerous to life, or is unfit for human habitation because of defects in drainage, plumbing, ventilation, or the construction of the same, or because of the existence of a nuisance on the premises and which is likely to cause sickness among its occupants, the said board of health may issue an order requiring all persons therein to vacate such building or part thereof for the reasons to be stated therein as aforesaid. Said board shall cause said order to be affixed conspicuously in the building or part thereof and to be personally served on the owner, lessee, agent, occupant or any person having the charge or care thereof; if the owner, lessee or agent cannot be found in the city of New York or do not reside therein or evade or resist service, then said order may be served by depositing a copy thereof in the post-office in the city of New York properly inclosed and addressed to such owner, lessee or agent at his last known place of business or residence, and prepaying the postage thereon; such building or part thereof shall within ten days after said order shall have been posted and mailed as aforesaid or within such shorter time not less than twenty-four hours, as in said order may be specified, be vacated, but said board, whenever it shall become satisfied that the danger from said building or part thereof has ceased to exist, or that said building has been repaired so as to be habitable, may revoke said order. Whenever, in the opinion of the board of health of the health department in the city of New York, any building or part thereof in the city of New York, an order to vacate which has been made by said board, is, by reason of age, defects in drainage, plumbing, infection with contagious disease, or ventilation, or because of the existence of a nuisance on the premises, which is likely to cause sickness among its occupants or among the occupants of other property in the city of New York, or because it stops ventilation in other buildings, or otherwise makes or conduces to make other buildings adjacent to the same unfit for human habitation, or dangerous or injurious to health; or because it prevents proper measures from being carried into effect for remedying any nuisance injurious to health or other sanitary evils in respect of such other buildings, so unfit for human habitation that the evils in or caused by said building cannot be remedied by repairs or in any other way except by the destruction of said building, or of a portion of the same, said board of health may condemn the same and order it removed, provided the owner or owners of said building can demand a survey of said building in the manner provided for in case of unsafe buildings, and may institute proceedings in the supreme court in the county of New York for the condemnation of said building. Said proceedings shall be instituted and carried on in the manner prescribed by the code of civil procedure, except as modified by this act. Upon the institution of said proceedings, the owner of said building or any person interested therein, may in his answer dispute the necessity of the destruction of said building or part thereof, as the case may be. In such case, the court shall not appoint commissioners unless proof is made of the necessity of said destruction. In such proceeding evidences shall be receivable by the commissioners to prove:

1. That the rental of the building was enhanced by reason of the same being used for illegal purposes or being so overcrowded as to be dangerous or injurious to the health of the inmates; or,

2. That the building is in a state of defective sanitation, or is not in reasonable good repair; or,

3. That the building is unfit, and not reasonably capable of being made fit, for human habitation; and, if the commissioners are satisfied by such evidence, then the compensation—

(*a*) Shall in the first case, so far as it is based on rental, be based on the rental of the building, as distinct from the ground rent, which would have been obtainable if the building was occupied for legal purposes and only by the number of persons whom the building was under all the circumstances of the case fitted to accommodate, without such overcrowding as is dangerous or injurious to the health of the inmates; and

(*b*) Shall in the second case be the amount estimated as the value of the building if it had been put into a sanitary condition, or into reasonably good repair, after deducting the estimated expense of putting it into such condition or repair; and

(*c*) Shall in third case be the value of the materials of the buildings.

Nothing in this section contained shall repeal any part of section five hundred and thirty-five of this act or impair any of the powers thereby vested in the board of health.

Early in the year 1896 it was determined by the Board of Health to make a careful sanitary inspection of the rear tenement-houses in this city, with a view to ascertain the condition of the same. The Sanitary Inspectors were instructed to report from time to time upon the sanitary condition of the different rear tenements located in their districts. Based upon reports furnished by these Inspectors, after careful examination by the Sanitary Superintendent and the Commissioners of Health, the following premises were ordered vacated by the Board of Health on May 26, 1896, with a view to condemn the same:

No. in Order of Vacation for Condemnation.	LOCATION.	No. of Persons Occupying Premises.	DEATH-RATE.	No. in Order of Vacation for Condemnation.	LOCATION.	No. of Persons Occupying Premises.	DEATH-RATE.
1	22 Baxter street (rear).....	116	32.14	8	36 Baxter street (rear)....	25	36.49
2	24 Baxter street (rear).....		16.13	9	36½ Baxter street (rear)...		42.86
3	308 Mott street (rear)......	110	26.09	10	246 Mott street (rear).....	200	12.28
4	310 Mott street (rear).....		55.55	11	248 Mott street (rear)......		8.06
5	312 Mott street (rear).....		21.74	12	250 Mott street (rear).....		91.58
6	314 Mott street (rear).....		95.00	13	252 Mott street (rear).....		12.50
7	316 Mott street (rear).....		38.46	14	254 Mott street (rear).....		20.82
				15	21 West street (rear)......	49	32.41

Premises Ordered Vacated by the Board of Health July 14, 1896, *for Condemnation.*

No. in Order of Vacation for Condemnation.	LOCATION.	No. of Persons Occupying Premises.	DEATH-RATE.	No. in Order of Vacation for Condemnation.	LOCATION.	No. of persons Occupying Premises.	DEATH-RATE.
16	17 Sullivan street (rear)...	10	41.38	30	156 Greenwich street (rear)	50	39.04
17	187 Spring street (rear)....	56	38.01	31	101 Greenwich street (rear)	30	63.02
18	187 Spring street (rear)....			32	103 Greenwich street (rear)	32	26.03
19	89 Thompson street (rear)..	17	39.13	33	105 Washington street (rear)	55	37.05
20	58 Thompson street (rear)..	20	54.84	34	107 Washington street (rear)		
21	68 Thompson street (rear)..	160	52.08	35	327 West Broadway (rear)..	22	32.09
22	70 Thompson street (rear)..			36	329 West Broadway (rear)..		
23	72 Thompson street (rear)..			37	350 West Broadway (rear)..	60	41.07
24	74 Thompson street (rear)..			38	352 West Broadway (rear)..		
25	105 Thompson street (rear).	68	18.18	39	354 West Broadway (rear)..		
26	107 Thompson street (rear)..	34	25.0	40	109 Mulberry street (rear)..	37	68.57
27	107 Thompson street (rear)..			41	119 Mulberry street (rear)..	23	75.05
28	109 Thompson street (rear).	19	23.42	42	121 Mulberry street (rear)..	48	58.02
29	19 West street (rear).......	20	.....	43	119 Baxter street (rear)....	50	34.03

No. in Order of Vacation for Condemnation.	LOCATION.	No. of Persons Occupying Premises.	DEATH RATE.	No. in Order of Vacation for Condemnation.	LOCATION.	No. of Persons Occupying Premises.	DEATH RATE.
44	121 Baxter street (rear)....	47	44.09	53	36 Cherry street (rear)....	472	43.04
45	134 Mott street (rear)......	127	26.01	54	38 Cherry street (rear)....		
46	136 Mott street (rear).....			55	81 Roosevelt street.........	40	52.02
47	138 Mott street (rear)......			56	86 Sheriff street (rear).....	38	24.05
48	14 Roosevelt street (rear)..	60	42.0	57	88 Sheriff street (rear)......	22	37.06
49	16 Roosevelt street (rear)..	64	30.9	58	83 Columbia street (rear)...	35	22.9
50	16 Roosevelt street (rear)..			59	85 Columbia street (rear)...	35	11.5
51	32 Cherry street (rear)....	107	22.02	60	87 Columbia street (rear)...	19	15.9
52	34 Cherry street (rear)....	123					

Premises Ordered Vacated by the Board of Health July 28, 1896, for Condemnation.

No. in Order of Vacation for Condemnation	LOCATION.	No. of Persons Occupying Premises.	DEATH-RATE.	No. in Order of Vacation for Condemnation.	LOCATION.	No. of Persons Occupying Premises.	DEATH-RATE.
61	350 East 3d street (rear)....	14	8.5	70	111 Lewis street (rear).....	10	46.8
62	326 East 11th street (rear)..	14	89.4	71	55 James street (rear)......	28	76.2
63	118 Cannon street (rear)....	16	10.1	72	59 James street (rear)......	27	50.
64	120 Cannon street (rear)....	18		73	61 James street (rear).....	33	
65	451 East Houston street (rear)..................	34	31.5	74	63 James street (rear)......	41	30.8
				75	20 Mott street (rear).......	22	25.5
66	453 East Houston street (rear)..................	32	33.33	76	88 and 90 Catharine street (rear)..................	20	22.9
67	105½ Lewis street (rear)...	16	26.7	77	77 Essex street (rear).......	38	21.2
68	107 Lewis street (rear).....	14	36.4	78	80 Essex street (rear).......		
69	109 Lewis street (rear).....	15	20.7	79	73 Norfolk street (rear).....	36	16.4

Premises Ordered Vacated by the Board of Health August 25, 1896, for Condemnation.

No. in Order of Vacation for Condemnation.	LOCATION.	No. of Persons Occupying Premises.	DEATH-RATE.	No. in Order of Vacation for Condemnation.	LOCATION.	No. of Persons Occupying Premises.	DEATH-RATE.
80	110 West 17th street (rear).	17	105.9	85	211 West 28th street (rear)..	21	66.6
81	112 West 16th street (rear).	10		86	127 West 3d street (rear)...	15	21.4
82	146 Eighth avenue (rear)...	27	23.2	87	260 West Houston street (rear)..................	25	72.2
83	148 Eighth avenue (rear)...						
84	150 Eighth avenue (rear)...						

The above summary indicates the action taken by the Department during the past year under the amendment to the New York City Consolidation Act, adopted by the Legislature of this State in 1895. It is safe to assert that no measure of greater sanitary importance has ever engaged the attention of this Board. The rear tenements of this city are, as a rule, survivals of a period when public hygiene was deemed of comparatively little importance; when the erection of dwellings for the poorer classes received practically no supervision by competent sanitary authority, and when provision for adequate light and ventilation in particular was deemed of minor importance in the construction of such dwellings. Old, dark, ill-ventilated, filthy, the lower stories saturated with moisture, with utterly inadequate provision for the disposal of refuse, these buildings are not only breeders of disease and death in themselves, but by reason of their close proximity to adjoining front tenements, they are also important factors in maintaining the latter in a permanently unsanitary condition, by depriving them, in large measure, of light and air. They are, as a rule, crowded by the poorest classes of the city's population, the low rentals necessarily charged attracting these classes. The death-rate in these tenements, especially among young children, is far in excess, not only of the city at large, but also that for the better class of tenements. Their utter lack of fitness for human habitation may, perhaps, be best shown by extracts from a report made by Sanitary Inspectors of this Department, with regard to certain of the rear tenements condemned by this Board:

"Premises consist of five-story brick tenements, surrounded by three-story frame tenement on the north and south, and on the east by a school, church and tenement-houses. The rear houses are occupied by 20 families, of 110 persons, with 5 apartments vacant, while 30 families of 150 persons occupy the front houses, making a total of 260 persons. The air space between these high buildings is only six feet ten inches wide.

"In the cellar under the rear houses are located the water-closet accommodations for all these people. Said accommodations consist of long, narrow school sinks, poorly constructed, insufficiently flushed, filthy and offensive. The brick walls thereof are defective and the overflow from said sinks saturates the earth, and renders the cellar bottoms very damp and filthy. These water-closet apartments are ventilated to the narrow opening between the front and rear houses. Wet clothes are hung to dry in this open space, which, together with the offensive exhalations from the school sinks, vitiates the atmosphere, so that the tenants in desperation close their windows rather than inhale it.

"The entire absence of sunlight and fresh air in the living-rooms of both front and rear houses cannot be too forcibly emphasized. It is simply impossible to secure either, even on the brightest day, so high and so close together are these buildings. On the third floors we found lights burning in the living-rooms at 3 P. M., with a clear sky. Some of the box-like apologies for bed-rooms have a small opening about eighteen inches square opening into the air space adjoining premises. The majority of the bedrooms have no direct ventilation, and how these people live under such conditions is hard to understand. We are informed that during the summer months many of the tenants sleep on the fire-escapes in the open air space between the buildings.

"The stairways are narrow and steep; the hallways are dark and foul. Smoke and coal-gas from the defective chimney-flues has discolored the walls and ceilings, so that it is impossible to make them white. The roofs leak, causing the rooms to be wet and damp. The plaster on walls and ceilings of halls and apartments is cracked in many places, and portions of it have fallen. The spaces around the sinks in the halls are constantly damp from waste splashings.

"In our judgment nothing can be done to improve the premises in respect to light and ventilation, the lack of which, together with other conditions, render them unfit for human habitation."

In availing itself of the power given by law to eliminate these menaces to the public health, the Board, while certain of public approbation in this line of action, nevertheless neglected no precaution to guard against hasty action in any special case, and to insure success in every case. The money interests involved were frequently large, and strenuous, although mistaken, opposition from those pecuniarily interested was in many cases to be expected, and was in fact encountered. The success attained in the prosecution of the work during the past year, as shown by the summary previously given, is the best evidence of the care exercised in preliminary investigation and consideration before formal action. It is the intention of this Board to push this work vigorously to a completely successful issue, for, as previously stated, it is believed that no branch of the sanitary work carried on by this Department is of greater importance to the public health.

LODGING-HOUSES.

Under the provisions of the Sanitary Code a lodging-house is taken to mean and include any house, building or portion thereof in which persons are harbored, received or lodged for a single night or for less than one week at a time. Lodging-houses in this city are conducted under permits issued by the Board of Health, based upon certain rules as to light, ventilation, plumbing, etc.

During the year 5,577 inspections were made for the purpose of examining beds and bedding as to cleanliness, and also as to plumbing, etc., and to ascertain generally whether the premises were kept in a good sanitary condition.

At the close of the year there were outstanding permits for 110 of these houses, located as follows:

West of Broadway.			East of Broadway.		
Location.	Lodgers	Houses.	Location.	Lodgers	Houses.
South of 14th street	1,387	9	South of 14th street	11,394	79
14th to 59th street	829	6	14th to 59th street	1,664	9
59th to 100th street	....	..	59th to 100th street	238	1
North of 100th street	....	..	North of 100th street	853	6
Total west of Broadway	2,216	15	Total east of Broadway	14,149	95

Total number of houses	110	Houses for over 50 and under 100	20
Total number of lodgers	16,365	Houses for over 100 and under 200	56
		Houses for over 200 and under 300	13
Classified as follows:		Houses for 300 and over	9
Houses for 50 lodgers and under	12		

DIVISION OF FOOD INSPECTION, OFFENSIVE TRADES AND MERCANTILE ESTABLISHMENTS.

The work of this Division during the past year has been greatly increased along several new and important lines of work. These are: First, the establishment of a permit system for the sale of milk; second, the inspection of milch cattle in this city, for the detection of diseases transmissible through the milk, or liable to injuriously affect its quality—more especially, tuberculosis—and finally, the inspection of mercantile establishments with respect to child labor therein, under chapter 384 of the Laws of 1896, and the issuing of certificates to children in manufacturing establishments, under chapter 991 of the Laws of 1896. These subjects will therefore receive special attention.

Permits for the Sale of Milk.

The importance of a pure milk supply in any community cannot be questioned. In this city cows' milk is the sole food of a large proportion of the infant population, and of many invalids as well. The means best adapted to secure an unadulterated and wholesome supply present a problem second, perhaps, in importance to no other with which this Department is called upon to deal. This problem presents itself under two aspects: First, the prevention of adulteration, or, more properly, of attenuation of milk, by abstraction from or addition to its normal constituents, and, secondly, the maintenance of a supply uncontaminated by disease producing organisms, and obtained from animals healthy in every respect.

During the latter part of 1895 the Department was greatly encouraged in its efforts to prevent the sale of adulterated milk in this city by the hearty co-operation of the new Court of Special Sessions. Dealers convicted of selling adulterated milk received sentences proportionate to the gravity of the offense, imprisonment being added to the fine in many instances. Successful efforts were made to trace the adulteration to the real perpetrator (wholesale dealer or producer) in cases where the innocence of the retail dealer was satisfactorily established. The number of milk inspectors was increased by five, exclusive of the Chemist and his assistants, with a corresponding increase in the frequency and thoroughness of inspection throughout the city. The co-operation of reputable dealers in this city was enlisted and cordially given, many of the wholesale dealers uniting to form an association, the articles of which bound its members to supply pure milk, and provided for the expulsion of any member convicted of selling adulterated milk. Section 186 of the Sanitary Code, which prohibits the sale of adulterated milk, was so amended as to explicitly define the normal percentage composition of milk required, and to prohibit the sale of milk from cows improperly fed or housed, or in an unhealthy condition.

As a result of all of the above, the sale of milk adulterated by the addition of water or preservatives, or by the removal of cream, was reduced to a minimum. It now remained to attack the equally, if not more, important problem of preventing the sale of milk bacterially infected, either through disease in the cow, or through improper handling of the milk, and in addition to assure the permanence of the good results already attained in respect to adulteration. This problem is complicated by the fact that the greater part of the city's milk supply comes from districts outside the jurisdiction of this Department. In several instances, however, the co-operation of the local authorities was secured, and the first step in the solution of the problem was made in 1895, by the inspection of a number of suburban dairies (notably in Hudson County, New Jersey) furnishing milk to this city. These inspections, which were made by the Chemist of the Department in connection with the local sanitary authorities, revealed in many instances an astonishingly bad condition of affairs. The assistance of the local authorities in removing these conditions was promised and the sale in this city of milk from these dairies was stopped. It was now decided to proceed further, by the adoption of a permit system for the sale of milk in this city. The following additional section of the Sanitary Code was therefore adopted in January, 1896:

"Section 221. No milk shall be received, held, kept, offered for sale or delivered in the city New York without a permit in writing from the board of health and subject to the conditions reof."

This was supplemented by the adoption in June, 1896, of sections 223 d 224, prohibiting, respectively, the sale of adulterated cream and con- nsed milk. These sections are as follows:

"Section 223. No cream that is adulterated shall be brought into, held, kept or offered for : in the city of New York, nor shall any one keep, or offer for sale, in said city, any such cream. : term 'cream' means the fatty portions of pure milk which rise to the surface when the milk ɛft at rest, or which is separated by other means. The term 'adulterated,' when used in this tion, refers to cream to which any foreign substance whatever has been added."

"Section 224. No condensed milk which is adulterated shall be brought into, held, kept or :red for sale in any place in the city of New York, nor shall any one have, keep, or offer for : in said city any such condensed milk. The words 'condensed milk' mean pure milk from ch any part of the water has been removed and to which sugar has been added. The term ulterated', when used in this section, refers to condensed milk in which the amount of fat is less n twenty-five per cent. of the milk solids contained therein or to which any foreign substance atever has been added, excepting sugars, as in preserved milks."

Measures were at once taken to put the requirements of section 221 to effect.

The following is an outline of the system adopted and now in success- l operation: Every dealer in this city is required to obtain a permit m this Department for the sale of milk, whether fresh or condensed. making application for the same, he must furnish, on blanks provided r the purpose, full information as to amount of daily sales, from whom e milk is purchased, time when delivered, and how it is kept during le, special attention being paid to the condition of the ice-box, if the ilk is kept in such a receptacle. If the dealer procures his milk from s own farm, or obtains it from a farmer, creamery, etc., outside the city, e must furnish information regarding the method of its shipment, the cation of the farm, creamery, etc., and the breed, condition, food, ousing and water supply of the cows. If the milk is to be sold from agons, the dealer must furnish additional information as to the name of he driver and the number of the wagon. Each applicant is given a cir- ular of information which embodies the sections of the Sanitary Code elating to the sale of milk, the regulations of the Department with regard o the same, rules for the handling and keeping of milk, and suggestions or testing by cream gauge and lactometer.

The information furnished by the applicant being found satisfactory, a ermit is issued. These are of two classes: (*a*) for stores; (*b*) for wagons. They are not transferable, are in force only during the pleasure of the Board of Health, and are revoked if no reasonable excuse is presented on he second trial and conviction for the sale of adulterated milk. Permits or stores must be conspicuously displayed in the latter, and each milk wagon must have its own number, and that of the permit, painted on it n a conspicuous place, and in large figures.

Careful record is kept of each permit issued, the card index system eing employed, and the record is so arranged as to permit of quick and onvenient reference to any class of facts desired.

The results obtained through the adoption of the permit system, as utlined above, have amply justified its inauguration. The control of the nilk supply is now far more close than was formerly possible, and a mass of valuable information regarding the sources of the supply is at hand, in convenient shape for use in the efforts constantly being made to extend the co-operation of local sanitary authorities in improving the sources of supply coming under their respective jurisdictions.

Milk Inspection in General.

This branch of the work has been carried on, during the year, upon the lines formerly established. Special attention has been given to inspections of retail stores in the tenement districts (particularly during the summer) and to those in the neighborhood of public schools. In the latter, attention has been given to the condition of the ice boxes in which the milk is kept, to the cleanliness of the utensils and the store in general, and to the condition of the glasses in which the milk is served to children. Careful and extended investigation has been made with reference to the use of antiseptics as preservatives of cream and condensed milk, and several large dealers were found to be using borax for this purpose. This was stopped, and the practice was not resumed, even under the temptations presented by the extremely hot weather which prevailed during August of 1896. Although the number of inspectors employed in " store inspections " was necessarily reduced by the detail of three men to other branches of the work, more inspections were made than during 1895. In spite of the increased number of inspectors, however, the number of adulterated samples of milk discovered, and the consequent arrests of dealers, have markedly diminished. This affords gratifying evidence of increasing success in dealing with the problem of milk adulteration in this city.

Inspection of Milch Cows—Tuberculin Test.

The efforts made to secure the co-operation of local sanitary authorities in districts supplying milk to this city, the inspection of several such districts in connection with the local authorities and the successful establishment of a system of milk permits, have all been noted as steps taken toward the improvement of the milk supply from what may be termed a bacteriological standpoint, as distinguished from the adulteration of milk in respect to its normal constituents. These steps have been supplemented in a most important respect by the inauguration of measures for the systematic examination of all milch cattle kept within the city limits, with special reference to the detection of animals suffering from tuberculosis. It may be taken as absolutely demonstrated that tuberculosis in cattle is the same disease as found in man, that a large proportion of milch cows are tuberculous, and that the milk from such animals frequently causes the disease in those who consume it. The importance of an early diagnosis of the disease in animals suffering from it need, therefore, only be stated to be appreciated, and it is most fortunate that, in the proper application of the so-called " tuberculin test," we are provided with a certain and rapid means of making such diagnosis.

The number of milch cows within the city limits has been ascertained by careful inspection to be something over 2,700. The milk from some 550 of them is consumed by the owners; that produced by the remainder ome 2,200) is sold in this city. It is estimated that some 20,000 persons re supplied with milk from these cows, and the importance of eliminating ie tuberculous animals from among them cannot, therefore, be over-stimated.

The following is an outline of the system of inspection adopted in uly, 1896, and now being carried out within the city limits: A sanitary ispection of the premises is first made, including the housing, bedding, od, air space, water supply, etc., the general sanitary condition of the nimals and the handling and care of the milk. This being satisfactory, ae cows are marked by fastening a metallic numbered tag of the Departient in the ear, at a point where it is least liable to be rubbed off. A otice is then posted in the stable, which presents rules to be observed as o air space for each cow, general cleanliness, precautions to be observed uring milking and in the care of utensils, etc., and also during performnce of the tuberculin test by the Department. The notice also prohibits ie removal of cows from the stable without the permission of the epartment.

Next in order is the administration of the tuberculin, which embraces wo steps: First, determination of the normal temperature of the cow; nd second, injection of tuberculin and determination of the subsequent ise of temperature, should this occur. The tuberculin used is produced y Koch's method in the bacteriological laboratories of this Department. ts successful use for diagnostic purposes depends essentially upon the ollowing factors: First, determination in the animals to be tested of ffections other than possible tuberculosis, which might interfere with the est; second, accurate determination of normal temperature before injecion and of rise of temperature and duration of this rise after injection; hird, injection of tuberculin of proper quality, and in amount proportioned o the age, weight and physical condition of the animal; and, finally, elimination of possible fluctuations of temperature which might be produced by changes in the housing, feeding, milking or watering of the animals during the test. The routine followed in each test is briefly as follows: The animals are first examined by the veterinarian of the Department, and any showing affections which might interfere with the test are excluded. The temperature of the remainder is taken per rectum at three hour intervals for twelve hours. The maximum normal temperature being thus ascertained, tuberculin is injected, and after an interval of about ten hours temperatures are again taken, at three hour intervals, for twelve hours, the rise in temperature and its duration, which together are diagnostic, being thus ascertained, should any rise occur. Changes in the milking, food, housing, etc., of the animals are not permitted during the test. Animals found to be tuberculous are separated from the healthy cows, removed to a convenient place and slaughtered with the consent of the owner. An autopsy is made in each case. The carcass is then removed to the offal dock and the killing bed washed and disinfected. The stables, etc., are then thoroughly cleaned and disinfected, after which the healthy cows are allowed to be returned to the stable and a permit to keep said cows in the premises issued to the owner. This permit is not transferable, is revocable at the pleasure of the Board of Health and must be kept conspicuously posted. On its back are entered the tag numbers and description of the cows. Should the owner desire to increase his herd, the cows selected for this purpose must be isolated until tested and pronounced healthy by the inspectors of the Division.

The success of the work outlined above has been marked. In every case the result of the tuberculin test has been confirmed by autopsy. In four cases where animals which had been tested and pronounced healthy were subsequently slaughtered for food, an autopsy showed the animals to be normal in every respect.

In the prosecution of the work, herds from which the milk is sold were tested, beginning with those in New York Island, and continuing into the older and the more recently "annexed districts" in turn. The following is a summary of the work accomplished in 1896:

Number of herds examined	69
Number of temperatures taken	1,257
Number of cows examined	1,139
Number of cows found diseased and condemned	186
Percentage of cows diseased to cows examined	16.3%

Complete and accurate records of the work are kept in the offices of the Division in such shape as to permit of easy reference to any class of facts regarding the animals tested, to which access is desired.

It is difficult to overestimate the importance of this branch of milk inspection, as affecting the purity of the city's milk supply. Attention has already been called to the direct beneficial effect necessarily produced in respect to a not inconsiderable proportion of the total supply, *i. e.*, that produced by cows within the city limits. But the good effects produced already extend much further than this, and will extend further still. City purchasers of cows now contract to pay "subject to Health Department test" in many instances, and dealers are in consequence obliged to furnish healthy animals only. Letters and verbal inquiries are daily received from consumers as to whether the milk sold by certain dealers is furnished by cows inspected by the Department, the inquirer wishing to obtain milk of the best possible quality. To hold his customers, the dealer who procures his milk from sources of supply outside the city will in turn require satisfactory evidence from the producer as to its good quality. To furnish such evidence the producer must have his cows examined and tested by competent authority, and this involves extension of careful supervision and testing of milch cattle to every district in this and neighboring States which contributes its quota to the milk supply of this city. When such supervision and testing have become general and are properly carried out, supplemented as they will be by the unremitting efforts of this Department, it is difficult to conceive of any further measure through which the milk supply of this city could be improved.

Inspection of Meat and Fish.

The work of the Division in this respect has met with success during the year. As heretofore, the efforts of the inspectors have been mainly directed to the seizure of unwholesome meat or fish in bulk, at the points here it enters the city, and before its distribution among the retail ealers. In this they have been greatly aided by the commission men, ho have shown every desire to prevent the sale of unsound food roducts in this city. The seizure and condemnation of "bob" veal has een facilitated by the amendment to section 30 of the Sanitary Code, hich exactly defines this unwholesome product. Special attention has een given to the enforcement of the amendment to section 32 of the ode, adopted in March, 1896. This amendment prohibits the exposure f any meat, poultry or game outside of any shop or in the open windows r hallways thereof. Its provisions are now very generally adopted hroughout the city. The result of the work of the Inspectors charged ith the inspection of meat and fish is as follows:

umber of inspections	102,923
umber of pounds of meat and fish condemned, seized and sent to the offal dock	2,660,957

Inspection of Fruit and Foods.

In this branch of the work special efforts have been successfully made o improve the quality of the foods offered for sale in the section of the ity south of Houston street and east of the Bowery. This improvement, hich is marked, has been reached by daily inspections throughout the istrict named, and by careful watch of the commission houses, with a iew to prevent the carting away of unsound and decayed fruit and egetables by street venders, who watch their opportunity to seize such oods, and later expose them for sale in the district named above. Special attention has been given to preventing the sale of unripe fruits in he early summer, by the seizure of the goods and the arrest of the ealers. Candy offered for sale throughout the city has been found in general to be of good quality. In no instance were poisonous colors ound to be used in its manufacture. Many inspections have been made of the ice-boxes located in markets, ice-cream saloons and restaurants. In a number of instances these were found to be tapped directly into a sewer or water-closet, in violation of the law. In every such instance the alterations required by the Inspector were promptly made. A decided improvement in the quality of the fruit and foods offered for sale throughout the city has taken place during the year, mainly through the efforts of the regular Inspectors, but due in some degree to the other Inspectors of the Division, who during the hot weather have done what they could to aid in this respect, while on the rounds of their ordinary duties. The result of the work of the Inspectors charged with the inspection of fruit and food is as follows:

Number of inspections	187,436
Number of pounds of fruit and foods condemned	4,864,941

Inspection of Offensive Trades.

The beneficial effect of the work done in former years in the suppression of nuisances of this character has been plainly visible in 1896. This is shown by the fact that while many complaints have been received and investigated, they have in nearly every instance related to nuisances of a minor character. The gas-houses throughout the city, formerly prolific sources of complaint, have given comparatively little trouble during 1896, and such nuisances as have been produced through their agency have been promptly and effectively abated. One complaint was received in which the nuisance complained of was of so novel a character as to merit special reference. The complaint was to the effect that the Croton water in a certain locality was impregnated with illuminating gas to such an extent that on opening a tap in the cellar of the premises gas escaped in sufficient quantity to cause an explosion. When the Inspector visited the premises, the odor of gas was still plainly perceptible on opening the tap. On first thought, such a condition of affairs was an apparent impossibility, as the pressure of water in the pipes was much greater than that of the gas in the main. Upon investigation, however, a compressor of the Pintsch Gas Company was found in operation in the immediate vicinity. It also appeared that a few hours before the explosion occurred the pipe from the compressor to the receiver had broken while in use. This pipe was surrounded by a water jacket, connected with the Croton supply. When the break occurred, gas was forced into the water jacket, and thence into the main, thus impregnating the water supply of the neighborhood and causing the explosion.

Among the complaints received and investigated during the year may be mentioned those with reference to the discharge of ashes from the chimneys of the New York Steam Heating Company, at Fifty-eighth street and Madison avenue, the condition of the Central Park ponds, and the dangerous speed of the Broadway cable cars at the Fourteenth street curve. It is satisfactory to record that while the use of bituminous coal has materially increased in this city during 1896, the nuisance from smoke has greatly diminished.

CHEMICAL LABORATORY.

The analyses conducted in this laboratory during the past year have been mainly those of the city's milk and water supply, but have embraced in addition the examination of a number of other substances, mainly food products, with regard to which complaint was made, such as canned goods, candies, medicinal preparations, flavoring extracts, fermented and distilled liquors, etc. Special investigations, relating to the composition or suspected adulteration of certain food products and other substances, and involving the examination of a considerable number of samples of the same substance, have also been conducted, and a number of analyses have been made for other branches of the city government. Experimental work in relation to the exactitude and practical application of analytical methods employed in the examination of food products, etc., has been carried on throughout the year.

Analyses of Milk, Cream, Condensed and Evaporated Milk.

Samples brought daily to the laboratory by the Milk Inspectors have been examined for adulteration—mainly the addition of water, the removal of cream, or both. In case of adulteration and subsequent prosecution, the analyst has appeared in court as an expert witness. His duties in this latter respect have been much simplified by the amendment to the Sanitary Code of this Department, through which a standard is fixed for the composition of unadulterated milk. While before it was in many cases necessary for the analyst to substantiate his results in any given case by proof of personal knowledge of the composition of pure milk, coming from any or all of the localities which are sources of supply to this city, it is now only necessary to show that the sample in question is below the legal standard fixed by the Sanitary Code.

All of the brands of preserved (sweetened) and evaporated (unsweetened) milk sold in this City have been examined, with a view to detect adulteration, especially deficiency in fat through the use of skimmed milk in their manufacture, and the addition of antiseptics. In connection with the latter, experimental investigations have been made regarding the most accurate methods for the detection and estimation of boric acid, borax, and formaldehyde, when used as preservatives of milk, cream or evaporated milk.

An extended series of tests has been made of the accuracy of the de Laval butyrometer in the rapid estimation of fat in milk, and it has been found that with proper manipulation results will not differ more than 0.1 per cent. from those obtained by the most accurate analytical methods.

A large number of samples of cream have been analyzed throughout the year, for the determination of their average composition and the detection of antiseptics.

Analyses of Water.

Complete sanitary analyses of Croton water have been made weekly throughout the year, samples being taken from a hydrant near the Department. Comparative samples have also been analyzed from the gate-house at Amsterdam avenue and One Hundred and Thirty-fifth street, and at intervals from Central Park reservoir, and from various hydrants throughout the City. The results of the weekly analyses will be found in detail in the report of the Chemist, together with the yearly average, as compared with those of previous years. The following table shows the monthly average of the condition for the past year :

CROTON WATER.

Weekly analyses of Croton water were made to ascertain whether or not conditions existed which might tend to injure the public health. The following shows the monthly average of the condition of the Croton for the past year:

Monthly Averages of Croton for 1896.

Results in parts in 100,000.

	JAN.	FEB.	MAR.	APR.	MAY.	JUNE.	JULY.	AUG.	SEPT.	OCT.	NOV.	DEC.
Temperature, Fahr	38°	35°	35°	45°	62°	67°	71°	74°	67°	57°	49°	39°
Appearance	T.	T.	T.	T.	T.	S. T.	V. S. T.	V. S. T.	V. S. T.	S. T.	S. T.	S. T.
Chlorine in chlorides	0.289	0.268	0.228	0.271	0.261	0.253	0.264	0.260	0.266	0.267	0.289	0.289
Equivalent to sodium chloride	0.477	0.443	0.376	0.448	0.431	0.419	0.436	0.428	0.404	0.439	0.476	0.476
Phosphates	None.	None.	Trace.	Trace.	None.	None.	None.	None.	None.	None.	None.	None.
Nitrogen in nitrites	None.	None.	None.	None.	None.	None.	None.	None.	None.	None.	None.	None.
Nitrogen in nitrates	0.0355	0.0477	0.0446	0.0442	0.0264	0.0232	0.0235	0.0220	0.0223	0.0195	0.0213	0.0274
Free ammonia	0.0029	0.0046	0.0035	0.0025	0.0020	0.0019	0.0015	0.0020	0.0018	0.0015	0.0016	0.0017
Albuminoid ammonia	0.0260	0.0364	0.0333	0.0299	0.0226	0.0155	0.0137	0.0201	0.0158	0.0209	0.0158	0.0200
Total Nitrogen	0.0499	0.0814	0.0749	0.0703	0.0469	0.0375	0.0345	0.0422	0.0366	0.0378	0.0376	0.0441
Hardness before boiling	4.74	3.69	3.66	3.46	3.82	3.83	3.75	4.36	4.64	4.33	4.49	4.51
Organic and volatile matter	2.72	3.30	2.68	2.48	2.28	2.25	2.06	2.18	2.05	2.54	2.10	2.34
Mineral matter	8.20	9.70	8.00	8.20	5.74	5.32	5.20	5.67	5.93	6.14	6.13	6.96
Total solids	10.92	13.00	10.68	10.68	8.02	7.57	7.26	7.85	7.98	8.68	8.23	9.30

T.—Turbid. S. T.—Slightly turbid. V. S. T.—Very slightly turbid.

AVERAGE.

Temperature, Fahr	53°	Free ammonia	0.0023
Appearance	S. T.	Albuminoid ammonia	0.0225
Chlorine in chlorides	0.267	Total Nitrogen	0.0495
Equivalent to sodium chloride	0.439	Hardness before boiling	4.11
Phosphates	Trace.	Organic and volatile matter	2.42
Nitrogen in nitrites	None.	Mineral matter	6.77
Nitrogen in nitrates	0.0298	Total solids	9.18

Analyses have also been made of water from wells and other sources of supply in the newly annexed districts of the City, and of water from tanks in tenement and apartment-houses.

The character of water found in cellars or excavations has also been determined in many cases, in connection with investigations made by the Chief Sanitary Inspector into the source of such leakage (from defective sewers, underground springs or water-courses, leaks in Croton mains, etc.).

An outbreak of dysentery in the New York Catholic Protectory during the past summer was the occasion for the examination of the water supply of that institution, which was derived in part from the mains of the New York and Westchester Water Company, and in part from wells (eight in number) located at various points on the grounds. The well water was found to be contaminated with sewage in every instance, while that from the mains of the Water Company was shown to be of good quality.

The presence of phosphates in Croton water for short periods in the earlier months of the year, and their previous occurrence during certain periods in 1892 and 1893, led to an extended investigation into the cause of this phenomenon, which is of exceptional importance in relation to the purity of our water supply. It was found that phosphates were present only when the water was turbid, following (in 1896) the occurrence of unusual freshets on the Croton water-shed; that Croton Lake, the settling basin for the whole water-shed, has at its bottom a sediment rich in phosphates, and that in time of freshet this sediment is disturbed and washed into the mains to a greater or less extent. Finally, it was determined that the phosphates were present in suspension in insoluble form, and not in solution in the water. In view of all the above, the conclusion was reached that the presence of phosphates in the Croton was of no sanitary significance.

The above investigation was supplemented by considerable experimental work in relation to the best methods for the determination of the character and quality of the sediments from potable waters.

Investigations for other Departments of the City Government.

These have been made from time to time for the Coroner's office, the Department of Buildings, the District Attorney's office, the Department of Public Works, the Police Department and the Department of Street Cleaning. They have included analyses and tests of drugs, human viscera in suicide or accidental poisoning cases, liquors, water from cellars and excavations, "knock-out drops," garbage, etc., etc.

DEAD ANIMALS AND OFFAL.

Dead animals are removed by the contractor, Thomas F. White, from the streets of the city to the offal dock at the foot of Thirtieth street, North river, and with all offal which may be delivered at the same point are conveyed to Barren Island for final disposition. The number of dead animals removed from the streets and the quantity of offal, etc., removed from markets, etc., during the year 1896 was—

Horses	10,492	Cats and dogs	52,141
Mules	21	Dogs from public pound	13,272
Donkeys	5	Barrels of offal	10,779
Colts	19	Barrels of beef	17
Ponies	7	Barrels of fish	12,222
Bulls	24	Barrels of bacon	3
Steers	4	Barrels of poultry	829
Cows	147	Cases of assorted meats	3
Asses	1	Quarters of beef	201
Goats	22	Quarters of veal	2,606
Deer	3	Boxes of game	75
Calves	2,730	Boxes of bolognas	83
Sheep	743	Boxes of cheese	12
Hogs	123	Cases of pork loins	15

LIFE SAVING CORPS.

On the 16th day of June, 1896, at your suggestion, three life saving stations were established: Two on the East river, at Hell Gate and Corlears Hook, and one on the North river, at the Cinder Beds. The force was composed of a captain and three boatmen (selected from the New York Volunteer Life Saving Corps), and continued in the service of the Department until the 31st day of October, 1896. The result of their work was the rescuing from the waters of the East River of twenty-six males and one female, and from the waters of the North River of twenty-five males and seven females.

METEOROLOGY.

The mean temperature of the year, as furnished by Daniel Draper, Ph. D., in charge of the Observatory in Central Park, was 53.4 degrees; the mean reading of the barometer was 29.947, and the prevailing direction of the wind was southwest. The quantity of rain that fell during the year was 36.70 inches, and the quantity of snow that fell during the year amounted to 64 inches. The following table shows by months the meteorological data for the year:

MONTHS.	Mean temperature, Fahr.	28-year mean.	Number of days when rain fell.	Inches of rain.*	Number of days when snow fell.	Inches of snow.	Date of lowest temperature.	Minimum temperature.	Date of maximum temperature.	Maximum temperature.	REMARKS.
	Degrees	Degrees						Degrees.		Degrees	
January	29.8	29.8	1	.11† .96	3	3.	6	—2	29	49	White frost, 30th and 31st.
February	31.9	31.4	6	.84† 6.83	8	9.5	17	—5	6	57	Fog, 13th and 28th.
March	32.6	34.6	8	2.29† 5.28	7	30.5	13	14	31	60	Fog, 26th and 30th; thunder and lightning, 16th.
April	52.3	51.4	4	.79† 1.27	2	3.	4	24	18	90	White frost, 9th; thunder and lightning, 17th; last snow, 7th.
May	67.0	63.2	10	2.51	..	....	1	45	10	92	Fog, 22d; thunder and lightning, 5th, 11th and 28th.
June	69.8	71.0	11	5.72	..	....	15	52	21	92	Fog, 8th; thunder and lightning, 8th, 9th, 10th, 17th and 21st.
July	76.8	75.4	11	7.41	..	....	17	60	13	91	Dew, 19th; thunder and lightning, 13th, 16th, 22d. 27th and 30th.
August	76.1	74.5	11	1.53	..	....	20	57	9	98	Thunder and lightning, 7th, 9th, 14th, 16th and 18th.
September	67.2	67.7	9	4.74	..	....	23	46	11	89	Dew, 5th, 25th and 27th; thunder and lightning, 3d and 19th.
October	53.8	53.8	9	1.74	..	....	25	36	31	72	Fog, 30th; dew, 28th and 30th; white frost, 26th.
November	49.9	46.8	8	.39† 2.84	2	5.	30	29	27	72	Fog, 18th and 26th; white frost, 10th and 23d; first snow, 13th.
December	34.2	35.1	2	.84† 1.13	4	13.	24	9	13	57	White frost, 12th.
Year	53.4	52.9	90	5.26† 41.96	26	64.	..	Aver., 30.4	..	Aver., 76.6	

* Including snow-water. † Indicates inches of snow-water.

THE MINTURN HOSPITAL FOR SCARLET FEVER AND DIPHTHERIA PATIENTS.

So much opposition was manifested to the passing by the Legislature of an act to authorize the Commissioners of the Sinking Fund to lease property belonging to the City in East Seventeenth street for the purpose of this hospital, that the Board of Health felt constrained to address the following communication to your Honor on April 27, 1896, requesting your approval of the act:

"New York, April 27, 1896.

"*Hon.* William L. Strong,
Mayor of the City of New York:

"Sir—In respect to the act entitled, 'An Act to authorize the Commissioners of the Sinking Fund to lease certain lands in said city' to the 'Hospital for Scarlet Fever and Diphtheria Patients,' which has passed both houses of the Legislature and is now before your Honor for consideration and action, I desire to submit the following statement:

"The Board of Health has for many years realized the necessity of a hospital for contagious diseases of the character proposed in this bill, to which persons sick in hotels and boarding-houses or in private dwellings, and who have means to pay for medical attendance, nurses, board, etc., can be removed, thereby relieving other inmates of such hotels, boarding-houses and private dwellings, as well as their friends and relatives, from all danger of contagion. Many such persons have been unwilling to accept accommodations in the public contagious disease hospitals of the Health Department, and to be inmates of institutions supported and maintained at the expense of the City. While persons sick with diseases not contagious can obtain the best of care and treatment and all the comforts of a home in such admirable hospitals as the New York, the Roosevelt, the Presbyterian, the Mount Sinai, the St. Luke's, the St. Vincent's and many others, there has never been similar accommodation in this city for those afflicted with contagious disease. To a thoughtful, charitable and public spirited lady, Mrs. John W. Minturn, and to those who have joined her in this enterprise, is due the honor of inaugurating a movement which promises under this act of the Legislature to fill a blank that has always existed in the distinguished charities of this charitable city, and afford to those sick with contagious disease the same hospital accommodations as have heretofore been amply provided for persons sick and afflicted with other diseases. The contributions already made for this purpose are ample to accomplish the desired object, and the City of New York is only required by this bill to allow the necessary buildings to be erected and maintained upon a plot of ground which has already been devoted in great part to the care of persons sick with contagious disease.

"The site of the proposed hospital is in every respect admirable. On the north and east sides are the waters of the East river; upon the south the Reception Hospital for contagious diseases, and on the west the Willard Parker Annex for the care and treatment of diphtheria and scarlet fever. These hospitals now in use for the care of contagious diseases separate the proposed hospital from residences and tenements, the nearest of which are more than 400 feet away. These hospitals are not and never have been, in the opinion of the Board of Health, the slightest menace to the health of the people in that part of the city. Although the Reception and Willard Parker Hospitals have been located in this place for more than ten years, no person in the neighborhood has ever, so far as known, contracted any disease from said hospitals.

"In view of the facts that such hospital is much needed in this city and that charitable and public spirited citizens have provided the means for its erection, and that the proposed site is an ideal one in every respect and does not endanger the lives or health of the nearest residents, I respectfully urge, in behalf of the Board of Health, that the bill above referred to be approved and become a law.

"Very respectfully.
(Signed) CHARLES G. WILSON,
President."

The above communication fully explains the purpose for which the hospital is to be used and, since your approval of the act, it has received the Governor's sanction and become a law, and the hospital, which is now in the course of construction, is expected to be ready for the reception of patients by the middle of the coming year.

GREATER NEW YORK.

On the 19th day of October, 1896, a communication, of which the following is a copy, was received by this Department from the Sub-committee on draft of the Greater New York Commission:

"New York, October 19, 1896.

"Dear Sir—The Sub-committee on Draft of the Greater New York Commission are giving serious study to the problem of decentralizing administration in the enlarged city. A proposal is under consideration to establish in each one of the several boroughs into which the city may be divided, not to exceed ten in number, a borough hall, in which shall be located representatives of the various departments as to such of their bureaus as may be thus advantageously brought into close relations with the citizens of the neighborhood.

"As to your Department, I have been deputed to inquire what part of your work could be advantageously located in such borough halls, as distinguished from a central office, to the advantage of the work of the Department and to the convenience of the citizens of the borough.

"It is to be understood that work to be done in any borough will be under the general control of the head of the Department, precisely as though it were being conducted directly from headquarters. It is particularly desired to make it possible for the citizen of a borough to pay all taxes, assessments and water rates at the borough hall, to secure all service from the Department of Public Works that he may need in the way of ordinary street repairs and the like, to obtain permits for opening streets, etc., etc. But outside of these self-evident things, the Committee would be glad to receive suggestions from the Commissioners familiar with the detailed work of each department as to what part of their business can be thus decentralized.

"This letter is sent to the corresponding department in New York and Brooklyn. In replying, please do not forget that the similar department in the Greater New York must minister from the outset to more than 3,000,000 of people scattered over a wide territory on three different islands, besides the mainland. Decentralization of administration, therefore, in some form, is inevitable. By replying carefully to this communication you will help the Greater New York Commission to do this part of its work intelligently.

"As time presses upon the Commission, I must ask to be favored with your reply by Saturday, October 24. Please address me at Columbia University.

"For the Committee. Respectfully, (Signed) SETH LOW,
Commissioner."

After careful consideration, an answer to this communication was sent to Hon. Seth Low, Commissioner, embodying the opinion of the Commissioners of Health on the subject submitted, of which the following is a copy:

"New York, October 22, 1896.

"*Hon.* Seth Low, *Commissioner, etc.*

"Sir—Yours of October 19, inquiring what part of the work of this Department should be located in borough halls, or branch offices, as distinguished from a central office, 'to the advantage of the work of the Department and the convenience of the citizens of the borough,' has received due consideration, and the following is respectfully submitted as the opinion of this Department on this subject:

"The extension of the territory subject to the jurisdiction of this Department makes necessary branch offices, at which, for the convenience of the public, some parts of the public business can be transacted, and for this reason this Department obtained an appropriation for 1896 for the establishment of a branch office, to be centrally located in that part of this city lying north of and beyond the Harlem river. With the union of New York, Brooklyn, Long Island City and other territory in 'Greater New York,' additional branch offices would be necessary, and the office in Brooklyn would be second only in importance to the Central Office, which should be located in New York. Branch offices would be necessary in the Annexed District (northern New York), in Brooklyn, in Staten Island and in Long Island City, but any other branch offices would be a large and unnecessary expense to the new corporation, would complicate and embarrass the business of the Department, and not add materially to the convenience and accommodation of the public. Any artificial division of New York City below the Harlem river, or of Brooklyn (Kings County), for the purposes of the business of this Department, would be impracticable and unnecessary.

"In New York, below the Harlem river (Manhattan Island), should be located the Central Office, having general supervision and control of the business of the Health Department in the new and enlarged city. The Sanitary Superintendent attached to the Central Office should be the chief executive officer of the entire city, and the Register of Records attached to the Central Office should have charge of the vital statistics of the whole territory and the registration of the births, marriages and deaths.

"To the Central Office should be attached an Assistant Sanitary Superintendent, having special charge of the sanitary work of the Medical and Sanitary Inspectors whose districts are within the present limits of New York below the Harlem river, with an ambulance and disinfecting corps for the district. In Brooklyn, Kings County, there should also be an Assistant Sanitary Superintendent, who should perform the same duties within the limits of that district as are performed by the Assistant Sanitary Superintendent in New York, and have charge of all Sanitary and Medical Inspectors, and of all sanitary work in the district, including the care of contagious diseases, disinfecting, etc. At the Brooklyn office burial permits should be issued, and all the facilities provided for expediting sanitary work that are now in existence in that city.

"At the branch offices in northern New York, Long Island City and Staten Island there should be a Chief Inspector in charge of the Sanitary Inspectors and sanitary work in their respective districts, and at those offices burial permits should be granted and the same facilities afforded for the accommodation of the public in connection with the business of the Health Department as are now provided at the New York and Brooklyn offices.

"The above is practically the organization which existed from 1866 to 1870 under the Metropolitan Board of Health, whose jurisdiction covered the same territory and more than is now proposed to include in the new and enlarged city, and this organization was found to be practicable and economical, and satisfactory so far as the convenience and accommodation of the public was concerned.

"The large territory to be included in 'Greater New York,' and the division of the same by navigable water, makes decentralization necessary to á proper extent. The division, however, should be natural and not artificial, and it is confidently believed, from the experience of the officers of this Department, and from the history and records of the Metropolitan Board of Health, that the important sanitary duties devolving upon the Health Department of the new and enlarged city would be performed at much less expense and with greater satisfaction to the people if the division should be as above indicated, viz.: 1. New York (below the Harlem river); 2. Brooklyn (Kings County); 3. Long Island City (with Queens County towns); 4. Northern New York (above the Harlem river); 5. Staten Island. Very respectfully,

"(Signed) CHARLES G. WILSON,
President."

MEDICAL INSPECTION OF SCHOOLS.

In October, 1896, a communication was received from the Sanitary Superintendent, setting forth his belief that the greatest source of the transmission of infectious and contagious diseases among the children of this city is through their contact one with another in school; and that this transmission could best be overcome by systematic daily examination of the school children by Medical Inspectors of this Department, with a view to the prompt exclusion from school of children found to be suffering from contagious or infectious diseases. This communication will be found in full elsewhere.

It was suggested that this work should properly commence among the younger children, that is, those attending Primary Schools, Primary Departments of Grammar Schools, and Parochial Schools, of whom there was found to be an average daily attendance of something over 140,000 in the city below the Harlem river.

It was also suggested that, in order to shorten and minimize the work and to reduce the number of Medical Inspectors required for its proper performance to as low a figure as possible, the teachers in these schools should be required to set apart daily for examination in their respective classes all children not appearing to them to be in good health; the examination of the Medical Inspectors to be confined to the children so selected.

In order to obtain, if possible, definite data as a basis for action upon the lines suggested above, Medical Inspector George S. Lynde was detailed to make a special investigation regarding the spread of contagious diseases through the contact of children in schools. Dr. Lynde's report, made on November 19, 1896, will be found in full elsewhere. He at first selected two districts, Houston to Fourteenth street, east of Broadway, and Twenty-sixth to Forty-second streets, west of Seventh avenue, iting all the cases of scarlet fever and diphtheria reported in these tricts during a period of a few weeks. It was found, however, that tter results could be obtained by securing the "absence list" of a class which a case of contagious disease had occurred, and then visiting the ildren to ascertain the causes of absence. This plan was therefore lowed. Both methods of investigation afforded most conclusive idence of the great importance of contact in schools as a factor in the nsmission of infectious and contagious diseases among children, and tirely justified the opinion and recommendations of the Sanitary perintendent set forth above.

An application was therefore made to the Board of Estimate and pportionment for the appointment of one Chief Medical School spector and one hundred and fifty Medical School Inspectors, to serve ring the school term of each year (September to June inclusive).

The plan of work proposed is briefly as follows: The Inspectors will sit their respective schools at the opening hour on every school day, amining all pupils set apart for this purpose by the teachers of the hool. All pupils showing symptoms of any contagious disease are to excluded from school, and furnished with a card stating the cause for clusion. The names and addresses of all children examined, with the sults of examination, also the names and addresses of children excluded om schools by the principals thereof by reason of contagious disease in eir families (when notification has not been sent to the schools by this epartment) are to be forwarded daily to the Chief Medical School Inector. The Medical School Inspectors will not give professional treatent in any case. They are simply to examine all children thought to ailing, point out the need of treatment, should this exist, and exclude ntagious cases from school. The further sanitary surveillance of congious cases will be undertaken, if necessary, by the District Medical spectors attached to the Division of Contagious Diseases.

It is believed that the establishment of the system of medical school spection outlined above will afford great aid to this Department in its forts to prevent the spread of contagious and infectious diseases in this ty.

SUITS FOR THE ENFORCEMENT OF ORDERS.

The office of the Attorney continues to render valuable aid and assistnce to the Board in enforcing the orders of the Sanitary Superintendent.

Of the 20,379 orders referred during the year by the Sanitary Superinndent to the Attorney for prosecution, 16,889 were complied with upon ceipt of notice from him of his intention to commence suit.

The following statement shows in detail the work performed through e medium of this office during the year :

mber of orders received for prosecution	20,379	
mber of orders pending December 31, 1895	1,053	
		21,432
torney's notices issued on orders received in 1896	20,379	
her Attorney's notices	3,317	
		23,696

Nuisances abated before suit	16,889	
Orders extended or in course of prosecution	2,091	
Nuisances abated after suit was brought	2,452	
		21,432

Civil Actions.

For violation of Tenement-house law	2,594	
Actions pending December 31, 1895	223	
Judgments opened by the Court	149	
		2,966

Disposition of Civil Actions.

Civil actions discontinued for cause (compliance with orders, etc.) by the Board of Health	2,405	
Judgments rendered in favor of Department	243	
Actions pending December 31, 1895	318	
		2,966

Disposition of Judgments.

Total number of judgments		243
Judgments opened by the Court with costs	13	
Judgments opened by the Court without costs	136	
Judgments upon which executions have been issued and transcripts filed	72	
Judgments upon which motions to open defaults are still pending, and execution stayed by the Court	22	
		243

Executions issued	112
Transcripts filed	112
Judgments opened by the Courts	149
Judgments, Criminal Courts, for violation of Sanitary Ordinances	464
Moneys collected and paid to the City Chamberlain in Civil Actions	$86 50
Fines imposed in Criminal Courts for violation of Sanitary Code	$9,080 00

Fines are classified as follows:

Adulterated milk	$7,650 00	
Manure, swill, ashes, nuisance, etc	697 00	
Section 197, Sanitary Code, live fowls	290 00	
Section 32, Sanitary Code, exposing meat	130 00	
Decayed fruit	313 00	
Total		$9,080 00

RECEIPTS AND EXPENDITURES.

During the year, the receipts from various sources, all of which have been duly accounted for to the Comptroller and deposited with the City Chamberlain, were as follows:

For searches and transcripts of the records		$6,960 50
Sales of vaccine virus		864 61
Sales of diphtheria and other antitoxins		13,308 70
Amount collected in settlement of judgments in civil actions for the enforcement of the several sections of the Sanitary Code		91 50
Received from the United States Government, for the care of immigrants (in the hospitals of the Department) who were suffering from contagious diseases at the time of their removal	$956 00	
Received from steamship "Bourgogne," for care and maintenance of two (2) employees	64 00	
		1,020 00
Subscription to weekly circular of the Health Department		6 00
		$22,251 31

The amount of money appropriated by the Board of Estimate and Apportionment, to be applied by the Health Department for the payment of salaries, disinfection, maintenance of Willard Parker, Reception and Riverside Hospitals, and for the general expenses of the Department, was $535,528.25, in addition to which the sum of $956 was received from the United States Government for the care of immigrants suffering from contagious diseases, and the further sum of $64 from the steamship "Bourgogne" for the care of two employees suffering from contagious diseases, was placed to the credit of the Hospital Fund; and the sum of $5, unexpended balance, 1895, for burial of deceased soldiers, was placed to the credit of the Fund for the Burial of Honorably Discharged Soldiers, etc.

Making in all the sum of	$536,553 25
There was expended the sum of	535,568 79
Leaving a balance of	$984 46

TITLE OF FUND, 1896.	APPROPRIATION.	DATE.	CHANGE OF APPROPRIATION.
Removal of Offal, etc.	$25,000 00		
Law Expenses	2,000 00		
"Antitoxin"	30,500 00		
Time Detector	500 00		
Launch	2,850 00		
Disinfecting Apparatus	5,000 00		
Sanitary Police	70,800 00		
Free Ice (Emergency)		Aug. 13, 1896	Authorized by Board of Estimate
Soldiers' Burials	8,000 00	Jan. 1, "	Unexpended Balance of 1895
Pipe Trenches	5,500 00	May 19, "	From Hospital Fund
Rents	3,100 00	Oct. 6, "	To Contingent Fund
		Dec. 1, "	To Salaries Fund
		" 1, "	To Contingent Fund
		" 23, "	To Disinfection Fund
Contingent	11,000 00	Oct. 6, "	From Disinfection Fund
		" 6, "	From Rent Fund
		Dec. 1, "	"
		" 23, "	From Hospital Fund
		" 23, "	From Salaries Fund
Disinfection	22,000 00	Oct. 6, "	To Contingent Fund
		Dec. 23, "	From Rent Fund
Salaries	278,280 00	Jan. 1, "	10 Medical Inspectors, 2 months
		Feb. 20, "	" "
		May 5, "	" "
		June 19, "	Life Saving Corps, 4 months
		July 10, "	Division of Mercantile Establishments
		Dec. 1, "	From Rent Fund
		" 31, "	To Contingent Fund
Hospitals	54,978 00	Feb. 29, "	Care and Maintenance, Immigrants, January
		Mar. 31, "	" " February
		May 31, "	" " April
		June 30, "	" " May
		Aug. 31, "	Steamship "Bourgoyne"
		Oct. 31, "	Care and Maintenance, Immigrants, September
		Nov. 30, "	" " October
		Dec. 15, "	" " November
		" 31, "	" " December
		May 19, "	To Pipe Trenches Fund
		Dec. 23, "	To Contingent Fund
Totals	$519,508 00		

Appropriated and Expended.

Dr.	Cr.	Total Dr.	Total Cr.	Net.	Bond Issue.	Total Appropriation.	Total Expenditure.	Balance.
....	....	....	....	....	....	$25,000 00	$25,000 00	....
....	....	....	....	....	....	2,000 00	1,999 92	$0 08
....	....	....	....	....	....	30,500 00	30,430 67	69 33
....	....	....	....	....	....	500 00	500 00	....
....	....	....	....	....	....	2,850 00	2,800 00	50 00
....	....	....	....	....	....	5,000 00	4,811 00	189 00
....	....	....	....	....	....	70,800 00	70,800 00	....
....	....	....	....	....	$2,165 20	2,165 20	2,165 20	....
....	$5 00	....	$5 00	$5 00	....	8,005 00	7,875 00	130 00
....	200 00	....	200 00	200 00	....	5,700 00	5,700 00	....
$1,000 00	....	....	....	....	....	....	....	....
400 00	....	....	....	....	....	....	....	....
600 00	....	....	....	....	....	....	....	....
500 00	....	$2,500 00	....	2,500 00	....	600 00	600 00	....
....	1,000 00	....	....	....	....	....	....	....
....	1,000 00	....	....	....	....	....	....	....
....	600 00	....	....	....	....	....	....	....
....	1,000 00	....	....	....	....	....	....	....
....	385 00	....	3,985 00	3,985 00	....	14,985 00	14,977 04	7 96
1,000 00	....	1,000 00	....	....	....	....	....	....
....	500 00	....	500 00	500 00	....	21,500 00	21,500 00	....
....	....	....	....	....	2,000 00	....	....	....
....	....	....	....	....	2,000 00	....	....	....
....	....	....	....	....	2,000 00	....	....	....
....	....	....	....	....	1,274 84	....	....	....
....	....	....	....	....	6,580 21	....	....	....
....	400 00	....	400 00	....	....	....	....	....
385 00	....	385 00	....	15 00	....	292,150 05	292,148 38	1 67
....	420 00	....	....	....	....	....	....	....
....	32 00	....	....	....	....	....	....	....
....	14 00	....	....	....	....	....	....	....
....	16 00	....	....	....	....	....	....	....
....	64 00	....	....	....	....	....	....	....
....	18 00	....	....	....	....	....	....	....
....	202 00	....	....	....	....	....	....	....
....	192 00	....	....	....	....	....	....	....
....	62 00	....	1,020 00	....	....	....	....	....
200 00	....	....	....	....	....	....	....	....
1,000 00	....	1,200 00	....	180 00	....	54,798 00	54,745 31	52 69
$5,085 00	$6,110 00	$5,085 00	$6,110 00	....	$16,020 25	$536,553 25	$536,052 52	$500 73

The Commissioners desire to acknowledge the important assistance rendered to this Board in this sanitary work by all the Departments of the City Government. Whenever the Sanitary Inspectors observe any defect or condition in any sewer, dock, street or public building in this city which is likely to endanger life or health, directly or indirectly, copies of their reports are forwarded to the Department which is charged by law with the care and maintenance of such public property. Such reports have received due consideration and prompt attention, and the municipal departments are credited with many sanitary improvements which have contributed materially to the public health.

In conclusion, the Board desires to express and to place upon record its high appreciation of the faithful and efficient services of its officers, clerks and employees, and to fully recognize the fact that their capacity, devotion to duty and interest in the work of the Department have greatly contributed to its success and usefulness. Every person in the service of the Health Department fully understands that no personal or political influence can remove him from his position or employment, so long as he is faithful to duty, and that any advancement in rank or salary will depend solely upon merit and the value of services rendered. The management of this Department on business principles and strictly business methods is no small factor in whatever has been accomplished in preserving and protecting the public health.

Respectfully submitted,

CHARLES G. WILSON,
President and Commissioner of Health.

GEO. B. FOWLER, M. D.,
Commissioner.

ALVAH H. DOTY, M. D.,
Health Officer of the Port of New York.

THEODORE ROOSEVELT,
President Board of Police.

HEALTH DEPARTMENT,
SANITARY BUREAU,
NEW YORK, January 4, 1897.

o the Secretary of the Board of Health of the Health Department, New York:

SIR—I have the honor to submit herewith my report for the year 896, together with the reports of the

Chief Sanitary Inspector,
Chief Inspector of the Division of Contagious Diseases,
Chief Inspector of the Division of Food Inspection, Offensive Trades, nd the
Chief Inspector of the Division of Bacteriology, Pathology and Disinfection.

VACATION OF HOUSES.

During the year 1896, the number of houses ordered vacated, under section 659 of the Consolidation Act, was 322. This course is only taken in those houses where owners have refused to comply with the orders of he Board, and orders of vacation are only issued after most rigid and areful inspection of the premises by the Sanitary Superintendent. The number of cases in which vacation was required shows a marked decrease over previous years, while the orders issued by the Board of Health have argely increased.

The following tabulated statement and summary shows the date, ocation, character of premises, cause of action and the result of this work on the part of the Board :

No.	DATE.	PREMISES.	CAUSE.	RESULT.
1	Jan. 3	94 Columbia street.......	Defective plumbing.....................	Complied Jan. 23.
2	" 3	84 Columbia street.	"	" Jan. 8.
3	" 3	115 East 105th street.....	"	" Jan. 18.
4	" 3	226 East 104th street....	"	" Jan. 13.
5	" 3	350 East 62d street........	Defective drainage	" Jan. 16.
6	" 3	209 East 101st street	Defective plumbing.....................	" Jan. 21.
7	" 3	409 East 63d street.......	"	" Jan. 14.
8	" 3	213 East 97th street......	"	Vacated Feb. 24; complied Aug. 4.
9	" 3	411 Canal street..........	"	Complied Jan. 9.
10	" 3	385 Tenth avenue........	"	" Jan. 10.
11	" 3	954 Third avenue	"	" Jan. 25.
12	" 3	48 Delancey street.......	Defective plumbing and want of repair..	" Mar. 6.
13	" 3	35 Allen street...........	" " ..	" Jan. 17.
14	" 3	111 Orchard street.......	Defective plumbing.....................	" Jan. 15.
15	" 3	132½ Rivington street ...	Defective plumbing and want of repair..	" Jan. 11.
16	" 3	660 Water street.........	" " ..	" Jan. 18.
17	" 3	111 Hester street	" " ..	" Jan. 27.
18	" 10	60 Montgomery street....	Defective plumbing.....................	" Jan. 11.
19	" 28	209 Spring street	"	" Feb. 1.
20	" 28	123 Avenue D	"	" Feb. 15.
21	" 28	1887 Second avenue......	"	" Aug. 8.
22	" 28	16 Doyer street..........	"	" Feb. 10.
23	" 28	290 Front street..........	"	" May 25.
24	" 28	45 Essex street	"	" Feb. 13.
25	" 28	100 Clinton street........	"	" Feb. 6.
26	" 28	338 West 59th street	"	Vacated Feb. 10; complied April 17.
27	" 28	1472 Amsterdam avenue..	"	Complied Feb. 27.
28	" 28	212 Chrystie street.......	"	Vacated Feb. 5; complied Feb. 20.

No.	Date.	Premises.	Cause.	Result.
29	Jan. 28	410 East 18th street	Want of repair	Complied Feb. 10.
30	" 28	412 East 18th street	"	" Feb. 10.
31	Feb. 4	231 West 26th street	Defective plumbing	" Feb. 24.
32	" 4	537 East 118th street	" and want of repair	" Mar. 5.
33	" 4	342 Water street	"	" Feb. 20.
34	" 11	53 Elm street	Defective plumbing and want of repair	Vacated Feb. 17; compl May 22.
35	" 11	42 Hester street	Want of repair	Complied Mar. 23.
36	" 11	112 Ridge street	"	" Mar. 7.
37	" 18	162 Allen street	Defective plumbing	" Feb. 25.
38	" 18	211 West 58th street	Existence of a nuisance	" Mar. 4.
39	" 25	306 East 34th street	Defective plumbing	" Mar. 10.
40	Mar. 3	17 Rector street	Defective plumbing and want of repair	" April 8.
41	" 10	89 Thompson street	Defective plumbing	" Mar. 11.
42	" 10	North side 167th street, first house west of Amsterdam avenue	Defective drainage	" Mar. 16.
43	" 31	West side White Plains road, near Wakely place	"	" Apr. 21.
44	" 31	2212 First avenue	Defective plumbing, drainage and want of repair	" Apr. 15.
45	" 31	335 East 114th street	Defective drainage	" Apr. 9.
46	" 31	333 East 114th street	"	" Apr. 9.
47	" 31	407 East 112th street	Defective plumbing	" Apr. 14.
48	" 31	139 East 110th street	Defective plumbing and want of repair	" May 15.
49	" 31	88 East 109th street	Defective plumbing	" Apr. 14.
50	" 31	212 East 98th street	Defective plumbing and want of repair	" Apr. 17.
51	" 31	208 East 98th street	" "	" May 6.
52	" 31	232 East 97th street	" "	" Apr. 9.
53	" 31	300 East 46th street	Existence of a nuisance	" Apr. 7.
54	Mar. 31	49 Willett street (front)	Defective plumbing and want of repair	" Apr. 17.
55	" 31	49 Willett street (rear)	" "	" Apr. 17.
56	" 31	94 Cherry street	Defective plumbing	" June 5.
57	" 31	58 New Chambers street	"	" Apr. 18.
58	" 31	729 Cauldwell avenue	Defective drainage	" Apr. 27.
59	Apr. 14	300 West 148th street	Defective plumbing	" Apr. 27.
60	" 14	67 North Moore street	"	" Apr. 24.
61	" 14	327 West Houston street	"	" May 7.
62	" 14	132 Prince street	"	" Apr. 16.
63	" 14	157 East 109th street	"	" Apr. 23.
64	" 14	2211 First avenue	"	" June 25.
65	" 14	415 East 112th street	"	" May 11.
66	" 14	307 East 103d street	"	" Apr. 24.
67	" 14	105 East 28th street	"	" Apr. 21.
68	" 14	698 East 187th street	"	" May 11.
69	" 14	80 Eldridge street	"	" May 4.
70	" 14	156 Mott street	"	" June 27.
71	" 14	467 Fourth avenue	Defective drainage	" May 5.
72	" 21	35 Gouverneur street	Defective plumbing	Vacated May 7; compli May 29.
73	" 21	15 Baxter street	"	Complied May 8.
74	" 21	18 Ludlow street	"	" Apr. 25.
75	" 21	Northwest corner 141st street and Southern Boulevard	Defective drainage	Vacated May 1; compli June 3.
76	" 21	1967 Madison avenue	Defective plumbing	Complied May 19.
77	" 28	61 Willett street (front)	Defective plumbing and want of repair	" May 12.
78	" 28	61 Willett street (middle)	" "	" May 12.
79	" 28	154 East 118th street	Defective plumbing	" May 11.
80	" 28	61 Willett street (rear)	Defective plumbing and want of repair	" May 12.
81	" 28	281 Monroe street (front)	" "	Vacated May 12; complit Aug. 21.
82	" 28	4 Chestnut street	Defective plumbing	Complied May 12.
83	" 28	165 Elizabeth street	"	" May 4.
84	" 28	549 West 45th street	"	" May 11.
85	" 28	100 Mott street	"	" May 15.
86	" 28	546 West 49th street	"	" May 13.
87	" 28	1337 Avenue A	"	" Apr. 30.
88	May 5	353 West 41st street	Existence of a nuisance	" June 25.
89	" 5	15 Minetta street	Defective plumbing and want of repair	" May 11.
90	" 5	3 Broadway alley	Defective plumbing	" May 22.
91	" 5	405 East 112th street	"	" May 13.
92	" 5	East side Potter place, fifth house west of Bainbridge avenue	Defective drainage	" May 25.

	DATE.	PREMISES.	CAUSE.	RESULT.
	May 5	South side Potter place, second house west of Bainbridge avenue....	Defective drainage....................	Complied June 20.
	" 5	Southeast corner 129th street and Boulevard..	"	" June 10
	" 5	146 Lawrence street......	"	" May 22.
	" 5	2482 Hoffman street......	"	" May 26.
	" 12	1445 Second avenue......	Defective plumbing..................	" May 26.
	" 12	110 Roosevelt street	"	" May 21.
	" 12	316 East 115th street.....	"	" July 15.
	" 12	214 East 111th street.....	"	" June 18.
	" 12	1420 Broadway...........	"	" May 19.
	" 12	46 Monroe street.........	"	" June 10.
	" 12	58 Market street.........	"	" June 10.
	" 12	60 Market street	"	" June 10.
	" 12	443 East 13th street......	"	" June 18.
	" 12	189 Henry street.........	"	" May 25.
	" 12	788 Greenwich street.....	"	" May 26.
	" 12	533 West 42d street......	"	" May 22.
	" 12	North side 184th street, first house east of Vanderbilt avenue........	Defective drainage....................	" June 8.
	" 12	348 East 62d street.......	"	" June 16.
	" 12	346 East 62d street.......	"	" June 16.
	" 19	20 Essex street	"	" May 29.
	" 19	318 East 115th street.....	"	" July 22.
	" 19	291 East 3d street........	Defective plumbing and want of repair..	" June 20.
	" 19	494 Ninth avenue........	Defective drainage....................	" June 2.
	" 19	557 West 32d street......	"	" July 2.
	" 19	23 North Moore street....	"	" May 26.
	" 19	Northeast corner Madison avenue and 92d street	"	Vacated June 22; complied Sept. 19.
	" 19	18 East 98th street.......	"	Vacated May 25; complied July 16.
	" 19	North side 99th street, beginning 50 feet west of Madison avenue and extending 50 feet west...........	"	Vacated June 2; complied June 19.
	" 19	North side 98th street, beginning 150 feet west of Madison avenue and extending 50 feet west......	"	Vacated June 2; complied July 16.
1	" 19	South side 98th street, beginning 150 feet west of Madison avenue and extending 50 feet west.	"	Complied June 4.
3	" 19	North side 98th street, beginning 150 feet east of Fifth avenue and extending 50 feet east....	"	" June 5.
4	" 19	5 East 100th street.......	"	" June 16.
5	" 19	5 East 97th street........	"	Vacated June 2.
26	" 19	North side 100th street, beginning 125 feet west of Madison avenue and extending 50 feet west............	"	Vacated May 25; complied May 26.
27	" 19	28 East 101st street......	"	Vacated June 1; complied June 16.
128	" 19	North side 98th street, beginning 125 feet west of Madison avenue and extending 50 feet west.........	"	Vacated June 1; complied May 25.
129	" 19	26 East 101st street.......	"	Vacated May 25; complied June 3.
130	" 26	226 East 108th street.....	Defective plumbing....................	Complied June 10.
131	" 26	1833 Third avenue........	Existence of a nuisance................	" June 10.
132	" 26	95 Delancey street.......	"	Vacated July 1; complied Sept. 12.
133	" 26	237 East 108th street.....	"	Complied June 25.
134	" 26	313 East 75th street......	Defective plumbing....................	" June 11.
135	" 26	311 East 75th street......	"	" June 11.

No.	Date.	Premises.	Cause.	Result.
136	May 26	South side 189th street, second house east of Webster avenue	Defective drainage	Compiled June 27.
137	" 26	2270 Bathgate avenue	"	" June 5.
138	" 26	South side 96th street, 100 feet east of Fifth avenue and extending 150 feet east	"	Vacated June 4; complied Sept. 23.
139	June 2	163 East 75th st	Defective plumbing	Complied June 17.
140	" 2	330 Cherry street	"	" June 20.
141	" 2	68 West 43d street	Defective plumbing and want of repair	" July 22.
142	" 2	East side Third avenue, first house south of 187th street	Defective drainage	Vacated June 11; complied Dec. 5.
143	" 2	East side Third avenue, second house south of 187th street	"	Vacated June 8; complied Dec. 5.
144	" 9	67 West 131st street	Defective plumbing	Complied June 18.
145	" 9	69 West 131st street	"	" June 18.
146	" 9	221 East 11th street	Defective plumbing and want of repair	" July 6.
147	" 9	98 Bayard street (front)	Defective plumbing and drainage	" June 30.
148	" 9	98 Bayard street (rear)	" "	" June 30.
149	" 9	112 Goerck street	Defective plumbing	" June 23.
150	" 9	1 James Slip	Defective plumbing and want of repair	" July 1.
151	" 9	73 Monroe street	Defective plumbing	" June 25.
152	" 9	365 West 35th street (rear)	"	Vacated June 30; complied July 28.
153	" 16	2219 First avenue, or 356 East 114th street	"	Complied Sept. 2.
154	" 16	2217 First avenue	"	" Sept. 2.
155	" 16	2213 First avenue	"	" Sept. 2.
156	" 16	2215 First avenue	"	" Sept. 2.
157	" 16	Southwest corner 112th street and Boulevard	Defective drainage	" July 24.
158	" 16	427 West 16th street	Defective plumbing and drainage	" July 9.
159	" 16	246 West 62d street	Defective plumbing	" June 22.
160	" 16	76 West Houston street	Defective drainage	" July 15.
161	" 16	North side 178th street, first house east of Vanderbilt avenue	"	" July 3.
162	" 16	4187 Third avenue	"	" Aug. 18.
163	" 23	363 East 76th street	"	" July 15.
164	" 23	365 East 76th street	"	" July 7.
165	" 23	93 Market slip	Existence of a nuisance	" July 23.
166	" 23	365 East Houston street	Defective plumbing	" July 1.
167	" 23	532 West 29th street (front)	Defective plumbing and want of repair	Vacated July 6; complied Aug. 21.
168	" 23	532 West 29th street (rear)	" "	Vacated July 6; complied Aug. 21.
169	" 23	229 East 103d street	Defective plumbing	Complied July 20.
170	" 23	226 East 97th street	"	" July 1.
171	" 23	329 East 7[illegible]th street	"	" July 21.
172	" 23	829 West End avenue	Defective drainage	" Aug. 15.
173	" 23	322 East 115th street	Defective plumbing	" July 18.
174	" 30	87 Chrystie street	Want of repair	" July 23.
175	" 30	165 Madison street	"	" July 13.
176	" 30	336 Madison street	"	" Aug. 19.
177	" 30	324 West 125th street	Defective plumbing	Vacated July 11; complied Nov. 7.
178	" 30	240 East 90th street	Defective plumbing and want of repair	Complied July 17.
179	" 30	95 Washington street	Defective plumbing	" July 17.
180	July 7	21 Pell street	Defective plumbing and want of repair	" Sept. 28.
181	" 7	77 Mulberry street	" "	" Aug. 25.
182	" 7	125 White street	" "	Vacated July 16; complied July 22.
183	" 7	184 Madison street	" "	Complied Sept. 16.
184	" 7	318 East 73d street	Defective plumbing	" July 14.
185	" 7	450 East 115th street	"	" Sept. 11.
186	" 7	122 East 120th street	"	" July 17.
187	" 7	149 East 84th street	Defective plumbing and want of repair	" Aug. 7.
188	" 7	151 East 84th street	" "	" Aug. 7.
189	" 14	7 Elizabeth street	" "	" Aug. 28.
190	" 14	62 Baxter street	" "	" Aug. 1.
191	" 14	67 Park street	" "	Vacated Sept. 11; complied Oct. 9.

No.	Date.	Premises.	Cause.	Result.
92	July 14	69 Park street	Defective plumbing and want of repair	Vacated Sept. 11; complied Oct. 9.
93	" 14	Norfolk street	Defective drainage	Vacated July 20.
94	" 14	349 East 76th street	Defective plumbing and want of repair	Complied Sept. 17.
95	" 21	25 East 11th street	" "	" Sept. 2.
96	" 21	195 Elizabeth street	Defective plumbing	" Aug. 4.
97	" 21	128 Perry street	Defective plumbing and want of repair	Vacated July 27; complied Sept. 25.
98	" 21	264 Stanton street	Defective drainage	Complied Aug. 21.
99	" 21	68 West 35th street	Defective plumbing	" Aug. 18.
00	" 21	Southwest corner 189th street and west of Vanderbilt avenue	Defective plumbing and drainage	Vacated July 28; complied Dec. 5.
01	" 21	1088 Park avenue	Defective plumbing	Complied July 30.
02	" 21	155 East 97th street	Defective plumbing and want of repair	" Aug. 20.
03	" 21	1797 Third avenue	" "	" Aug. 13.
04	" 28	315 West 41st street	Defective plumbing	" July 31.
05	" 28	East side Inwood avenue, second house north of 173d street	Defective plumbing and want of repair	" Aug. 6.
06	" 28	478 Grand street	" "	" Sept. 11.
07	" 28	85 East Broadway	" "	" Aug. 24.
08	" 28	236 East 109th street	Want of repair	" Aug. 27.
09	" 28	1257 Third avenue	Defective plumbing and want of repair	" Aug. 7.
10	" 28	1259 Third avenue	Defective plumbing and want of repair	" Aug. 7.
11	Aug. 4	202 East 109th	Defective plumbing	" Aug. 27.
12	" 4	Southwest corner of Jerome and Sedgwick avenues	Defective drainage	" Sept. 25.
13	" 4	183 Madison street	Want of repair	Vacated Aug. 13.
14	" 11	932 East 175th street	Defective drainage	Vacated Aug. 18; complied Sept. 23.
15	" 11	2301 Eighth avenue	Defective plumbing	Complied Sept. 18.
16	" 11	685 Amsterdam avenue	"	" Aug. 28.
17	" 11	683 Amsterdam avenue	"	" Sept. 1.
18	" 11	533 Pearl street	"	" Sept. 17.
19	" 11	535 Pearl street	"	" Sept. 17.
20	" 11	537 Pearl street	"	" Sept. 17.
21	" 11	504 Ninth avenue	Existence of a nuisance	" Aug. 21.
22	" 11	415 West 37th street	Defective drainage	Vacated Aug. 19.
23	" 11	524 West 27th street	"	Complied Aug. 26.
24	" 11	15 Forsyth street	Want of repair	Vacated Sept. 5.
25	" 18	258 Elizabeth street	Defective plumbing and want of repair	Complied Oct. 7.
26	" 18	1410 Second ave	Defective plumbing	" Aug. 25.
27	" 18	171 East 110th street	Defective plumbing and want of repair	" Sept. 26.
28	" 18	221 Thompson street	" "	" Oct. 6.
29	" 18	6 Doyer street	" "	" Oct. 3.
30	" 25	292 Delancey street	" "	" Sept. 5.
31	" 25	66 New Chambers street	" "	" Sept. 2.
32	" 25	2701 Eighth avenue	" "	" Sept. 5.
233	" 25	767 East 176th street	Defective drainage	" Sept. 2.
234	" 25	155 East 112th street	Defective plumbing and want of repair	" Sept. 17.
235	" 25	2066 Second avenue	" "	" Sept. 9.
236	Sept. 1	548 West 37th street	" "	" Sept. 11.
237	" 1	132 East 32d street	Defective plumbing	" Sept. 9.
238	" 1	245 Rivington street	Defective plumbing and want of repair	" Sept. 14.
239	" 1	30 Bayard street	Defective plumbing	" Sept. 18.
240	" 1	104 East 90th street	Defective plumbing and want of repair	" Sept. 3.
241	" 1	241 East 77th street	Want of repair	" Sept. 10.
242	" 1	West side Amsterdam avenue, 123d and 124th streets	Defective drainage	" Dec. 4.
243	" 8	10 Eldridge street	Defective plumbing and want of repair	" Sept. 16.
244	" 8	19 Carmine street	Defective plumbing	" Sept. 22.
245	" 8	77 Oliver street	Defective plumbing and want of repair	" Sept. 26.
246	" 8	34 Stanton street	Defective plumbing	" Sept. 16.
247	" 8	544 East 15th street	"	Vacated Sept. 21.
248	" 15	8 Pell street	Defective plumbing and want of repair	Complied Oct. 6.
249	" 15	43 West 140th street	Defective drainage and want of repair	" Dec. 2.
250	" 15	2388 Second avenue	Defective plumbing and want of repair	" Sept. 26.
251	" 22	71 Willett street	Defective plumbing	" Oct. 13.
252	" 22	9 Rector street	Want of repair	Vacated Sept. 29; complied Dec. 2.
253	" 29	12 Pell street	Defective plumbing and want of repair	Vacated Dec. 29.
254	" 29	14 Pell street	" "	" Dec. 29.

No.	Date.	Premises.	Cause.	Result.
255	Sept. 29	2057 First avenue	Defective drainage, defective plumbing and want of repair	Complied Nov. 16.
256	" 29	2028 Third avenue	Defective plumbing and defective drainage	" Oct. 8.
257	" 29	232 East 122d street	Defective plumbing	" Oct. 12.
258	" 29	98 East Broadway	Defective plumbing and want of repair	" Nov. 16.
259	Oct. 6	431 West 34th street	" "	" Nov. 11.
260	" 13	131 East 120th street	Defective plumbing	" Oct. 26.
261	" 13	102 West 3d street	Defective plumbing and want of repair	Vacated Nov. 5; complied Dec. 11.
262	" 13	60 East 25th street	" "	Complied Oct. 21.
263	" 13	310 East 19th street	Defective plumbing	" Oct. 28.
264	" 13	630 East 13th street	Defective plumbing and want of repair	" Oct. 20.
265	" 13	52 Oliver street (front)	" "	" Nov. 19.
266	" 13	52 Oliver street (rear)	" "	" Nov. 17.
267	" 13	502 West 26th street	" "	" Oct. 26.
268	" 13	182 Madison street	Want of repair	" Nov. 11.
269	" 22	79 Mulberry street	"	" Nov. 19.
270	" 22	238 West 46th street	Defective drainage	" Oct. 30.
271	" 22	86 James street	Defective plumbing and want of repair	" Nov. 7.
272	" 22	152 East 98th street	" "	" Dec. 2.
273	" 22	68 West 141st street	Defective drainage	Work progressing.
274	" 22	417 East 112th street	Want of repair	Complied Dec. 15.
275	" 22	72 West 98th street	Defective plumbing	" Oct. 27.
276	" 22	Northwest corner 120th street and Amsterdam avenue	Defective drainage	
277	" 22	108 West 73d street	Defective plumbing	" Nov. 2.
278	" 27	2112 Western Boulevard	Defective plumbing and want of repair	Vacated Nov. 12.
279	" 27	45 New Bowery	Want of repair	Complied Nov. 17.
280	" 27	105 Macdougal street	Defective plumbing	" Nov. 10.
281	Nov. 6	504 East 135th street	Defective plumbing and want of repair	" Nov. 25.
282	" 6	215 Division street	" "	" Dec. 10.
283	" 6	315 East 109th street	Defective plumbing	" Nov. 14.
284	" 10	120 East 117th street	Defective plumbing and want of repair	" Dec. 18.
285	" 10	154 West 54th street	Defective plumbing	" Nov. 20.
286	" 10	317 West 32d street	"	" Nov. 12.
287	" 10	449 West 52d street	Defective plumbing and want of repair	" Nov. 17.
288	" 10	545 West 26th street	Defective plumbing	Work progressing.
289	" 10	502 West 26th street (front)	Defective plumbing and want of repair	"
290	" 10	502 West 26th street (rear)	" "	"
291	" 10	2 Avenue D	Defective plumbing	Complied Nov. 13.
292	" 17	37 to 43 West 93d street	Defective drainage	Vacated Nov. 23.
293	" 17	428 East Houston street	Defective plumbing	Complied Nov. 25.
294	" 17	21 Morton street (rear)	Defective plumbing and want of repair	" Nov. 27.
295	" 17	804 West End avenue	Defective plumbing	" Dec. 11.
296	" 17	Eagle avenue and 161st street	Existence of a nuisance	Work progressing.
297	" 24	167 Hester street	Defective plumbing and want of repair	Complied Dec. 15.
298	" 24	205 Elm street	" "	Work progressing.
299	" 24	515 West 27th street	" "	Complied Dec. 30.
300	" 24	328 West 17th street	" "	" Dec. 9.
301	" 24	161 West 4th street	Defective plumbing	" Nov. 28.
302	" 24	205 East 116th street	Defective plumbing and want of repair	" Dec. 4.
303	" 24	213 East 102d street	" "	" Dec. 10.
304	" 24	East side Southern Boulevard, second house south of 137th street (front)	Defective drainage	" Dec. 7.
305	" 24	50 Allen street	Defective plumbing	" Nov. 28.
306	" 24	1575 Madison avenue	"	" Dec. 15.
307	Dec. 1	225 West 29th street (front)	Defective plumbing and want of repair	Vacated Dec. 15.
308	" 1	22 Mott street	" "	Work progressing.
309	" 1	175 Division street	" "	Complied Dec. 31.
310	" 1	175½ Division street	" "	" Dec. 31.
311	" 8	218 East 73d street	" "	Work progressing.
312	" 8	369 East Houston street (front)	" "	Complied Dec. 17.
313	" 8	369 East Houston street (rear)	" "	" Dec. 17.
314	" 8	517 West 27th street	" "	" Dec. 24.
315	" 8	313 East 75th street	" "	Vacated Dec. 29.
316	" 15	54 Sullivan street	" "	Work progressing.
317	" 15	412 East 79th street	" "	Vacated Dec. 21.
318	" 15	3 Broadway alley	" "	Work progressing.
319	" 15	318 Mott street	" "	"
320	" 15	1341 Chisholm street	Defective plumbing	"
321	" 15	65 East 125th street	Defective drainage	"
322	" 15	2005 First avenue	Existence of a nuisance	"

Summary.

Number of houses ordered vacated after five days' notice		322
Orders complied with before vacation	264	
Work in progress	14	
Houses vacated after notice	44	
		322
Of those vacated orders since complied with	31	
Of those vacated nothing done	11	
		44

On May 9, 1895, section 659 of the Consolidated Act was amended, giving the Board of Health power to condemn rear tenements in the City of New York, as follows:

> "Whenever, in the opinion of the board of health of the health department of the city of New York, any building or part thereof in the city of New York, an order to vacate which has been made by said board, is, by reason of age, defects in drainage, plumbing, infection with contagious disease, or ventilation, or because of the existence of a nuisance on the premises which is likely to cause sickness among its occupants or among the occupants of other property in the city of New York. or because it stops ventilation in other buildings, or likewise makes or conduces to make other buildings adjacent to the same unfit for human habitation, or dangerous or injurious to health; or because it prevents proper measures from being carried into effect for remedying any nuisance injurious to health or other sanitary evils in respect of such other buildings; so unfit for human habitation that the evils in or caused by said building cannot be remedied by repairs or in any other way except by the destruction of said building, or of a portion of the same, said board of health may condemn the same and order it removed, provided the owner or owners of said building can demand a survey of said building in the manner provided for in case of unsafe buildings, and may institute proceedings in the supreme court in the county of New York for the condemnation of said building."

In the early part of 1896, the Sanitary Inspectors of the different districts were instructed to examine all the rear houses (about 2,300) in their districts and report those that were unfit for human habitation on account of lack of light and ventilation, or other causes, and to make a written report of same, giving a diagram, showing not only the premises to be condemned, but also the adjoining property.

The District Inspectors reported over five hundred rear tenements which, in their opinion, were in such condition that they might be condemned. These houses were carefully inspected by the President of the Board of Health, the Health Commissioner, the Sanitary Superintendent and the Chief Sanitary Inspector, and in those cases where, in their opinion, vacation of premises with view to condemnation proceedings was necessary, a Medical Sanitary Inspector and a Sanitary Inspector were sent to visit the premises, and a joint report of the condition of these rear houses, especially in regard to light and ventilation and its influence on the houses and adjoining buildings, was made. The rear houses were then photographed and a ground plan of the construction of the same was made. These reports were forwarded to the Board, with the indorsement of the Chief Sanitary Inspector and the Sanitary Superintendent, as follows:

> "Respectfully forwarded. In view of the very unsanitary condition of said premises, as reported by the Inspectors, I recommend that the house be visited by the Sanitary Superintendent, with the view of recommending its vacation by order of the Board of Health.
>
> "(Signed) ALFRED LUCAS,
> "*Chief Sanitary Inspector.*"

> "Pursuant to section 659 of the New York Consolidation Act of 1882, being chapter 410 of the Laws of 1882, as amended by section 9, chapter 84 of the Laws of 1887, and as further amended by chapter 567 of the Laws of 1895, I do hereby certify that on * * * I inspected premises situated and known as * * * rear, in the City of New York. Said premises are in the possession of and controlled by * * * .
>
> "And I hereby certify that the said building thereat is unfit, and not reasonably capable of being made fit, for human habitation by reason of want of proper ventilation and by reason of want of repair and defects in the drainage and plumbing, and because of the existence of a nuisance on the premises which is likely to cause sickness among its occupants, and the occupancy of said building is dangerous to life and detrimental to health.
>
> "And for the aforesaid reasons I respectfully recommend that said premises be vacated.
>
> "(Signed) CHAS. F. ROBERTS, M. D.,
> "*Sanitary Superintendent.*"

On May 26, 1896, the first action under this law was taken, and fifteen rear houses were ordered vacated by the Board of Health as being unfit for human habitation, and at the following meeting of the Board on June 2, 1896, a resolution condemning the same and ordering them removed was adopted. From time to time throughout the year like action was taken, vacating in all eighty-seven rear houses, after the resolution condemning same was adopted by the Board. On the day the houses were ordered vacated by the Board notices were posted on the inside and outside of the rear houses, requiring all persons to vacate the same within five days. At the same time a police officer notified all the tenants that they must vacate the apartments within that time. A similar notice was sent by mail to, and also personally served on, the owner of the premises. The following day the officer reported in writing the number of families and occupants of the house. Each day the premises were visited by the officer and the tenants notified that the building would be vacated at the specified time.

In nearly every case the buildings were entirely vacated before the expiration of the five days. Where persons were occupying them at that time, several police officers were sent to induce all tenants to leave the building, and they were not allowed to return except to remove their effects. After the occupants of the buildings vacated their apartments, the houses were daily visited by a police officer to see that they were not again occupied.

The rear houses at the following-named locations have been ordered vacated and condemned by the Board of Health as unfit for human habitation and have been vacated, and report of inspection on the thirty-first day of December, 1896, shows them to be unoccupied:

17 Sullivan street (rear).
58 Thompson street (rear).
68 Thompson street (rear).
70 Thompson street (rear).
72 Thompson street (rear).
74 Thompson street (rear).
105 Thompson street (rear).
109 Thompson street (rear).
19 West street (rear).
156 Greenwich street (rear).
101 Greenwich street (rear).
103 Greenwich street (rear).
327 West Broadway (rear).
329 West Broadway (rear).
350 West Broadway (rear).
352 West Broadway (rear).
354 West Broadway (rear).
109 Mulberry street (rear).
119 Mulberry street (rear).
121 Mulberry street (rear).
119 Baxter street (rear).
121 Baxter street (rear).
134 Mott street (rear).
136 Mott street (rear).
138 Mott street (rear).
14 Roosevelt street (rear).
32 Cherry street (rear).
34 Cherry street (rear).
36 Cherry street (rear).
38 Cherry street (rear).

81 Roosevelt street (rear).
16 Roosevelt street (rear) (2 houses).
83 Columbia street (rear).
350 East 3d street (rear).
118 Cannon street (rear).
120 Cannon street (rear).
451 East Houston street (rear).
453 East Houston street (rear).
109 Lewis street (rear).
111 Lewis street (rear).
55 James street (rear).
59 James street (rear).
63 James street (rear).
78 Essex street (rear).
80 Essex street (rear).
73 Norfolk street (rear).
127 West 3d street (rear).
146 Eighth avenue (rear).
148 Eighth avenue (rear).
150 Eighth avenue (rear).
211 West 28th street (rear).
308 Mott street (rear).
310 Mott street (rear).
312 Mott street (rear).
314 Mott street (rear).
316 Mott street (rear).
36 Baxter street (rear).
36½ Baxter street (rear).
21 West street (rear).

The rear houses at the following-named locations were ordered vacated and condemned by the Board of Health as unfit for human habitation. Plans and specifications for alterations were submitted and approved by the Board of Health and the Department of Buildings, and alterations have been made and houses are now occupied, and resolutions ordering vacation have been rescinded:

105½ Lewis street (rear).
107 Lewis street (rear).
20 Mott street (rear).
105 Washington street (rear).
107 Washington street (rear).

The rear houses at the following-named locations ordered vacated and condemned by the Board of Health as unfit for human habitation, have been torn down by the owners of premises:

88 and 90 Catharine street (rear).
260 West Houston street (rear).
107 Thompson street (rear) (1 house).
246 Mott street (rear).
248 Mott street (rear).
250 Mott street (rear).
252 Mott street (rear).
254 Mott street (rear).

The rear houses at the following-named location were ordered vacated and condemned by the Board of Health as unfit for human habitation; have since been altered by removing the partitions, etc., and in the future are to be used for manufacturing purposes:

187 Spring street (2 rear houses).

The rear houses at the following-named locations were ordered vacated and condemned by the Board of Health as unfit for human habitation. Plans and specifications have been submitted to and approved by the Board of Health, subject to the approval of the Department of Buildings; and the owners of same have declared their intention of altering and repairing the houses, in conformity with the plans and specifications submitted, and when said alterations are completed, the resolution ordering vacation and condemnation will be rescinded:

61 James street (rear).
326 East 11th street (rear).
112 West 16th street (rear).
110 West 17th street (rear).

The premises No. 107 Thompson street, two rear houses, were ordered vacated and condemned by the Board of Health as unfit for human habitation. One of these houses has been pulled down, and the other is at present vacant.

The rear houses at the following-named premises were ordered vacated, preparatory to condemnation, by the Board of Health, but were not condemned, as plans and specifications were submitted to and approved by the Board of Health, subject to the approval of the Department of Buildings, and the owners of same have declared their intention of altering and repairing the houses in conformity with the plans and specifications submitted. When said alterations are completed, the resolution ordering vacation of premises will be rescinded :

86 Sheriff street (rear).
88 Sheriff street (rear).
85 Columbia street (rear).
87 Columbia street (rear).

The premises Nos. 22 and 24 Baxter street (rear), were ordered vacated by the Board of Health, but were not condemned, and report of inspection on the 21st day of December, 1896, shows the premises to be unoccupied.

The premises No. 89 Thompson street (rear), were ordered vacated by the Board of Health as unfit for human habitation, but alterations were made at once, and the house was not condemned and is now occupied.

Summary.

Rear houses ordered vacated preparatory to condemnation	87	
Of these the number condemned was	80	
Unoccupied, no action taken	61	
Altered and improved, and resolution ordering vacation and condemnation rescinded	5	
Houses torn down by owners	8	
Altered for business purposes	2	
In progress of alteration	4	
Vacated and not condemned	7	
		87

PUBLIC NUISANCES.

There are a number of places in the city not occupied as dwellings which have become public nuisances, and in conformity with section 535 of the Consolidation Act, the Board has taken action in forty-five cases.

The following tabulated statement and summary shows the date, location, character of premises, cause of action and the result of this work on the part of the Board:

No.	Date.		Premises.	Character of Premises.	Result.
1	Mar.	3	12 Elm street	Factory	Complied Apr. 1.
2	Apr.	14	651 Eleventh avenue	Stable	" May 7.
3	"	21	122 Nassau street	Store	" May 6.
4	"	28	281 Monroe street	Stable	" May 5.
5	"	28	207 West 42d street	"	" Sept. 22.
6	"	28	209 West 42d street	"	" Sept. 22.
7	"	28	211 West 42d street	"	" Sept. 22.
8	May	5	121 East 87th street	"	" June 20.
9	"	5	123 East 87th street	"	" June 20.
10	"	12	320 East Houston street	Workshop	" May 16.
11	"	12	Northwest corner Main street and Lane avenue	Stable	" May 21.
12	"	19	North side 100th street, beginning 125 feet west of Madison avenue and extending 50 feet west	"	Vacated May 25; complied May 29.
13	"	19	North side 98th street, beginning 125 feet west of Madison avenue and extending 50 feet west	"	Vacated June 1; complied June 3.
14	"	19	28 East 101st street	"	Vacated June 2; complied June 4.
15	"	19	26 East 101st street	"	Vacated May 25; complied May 26.
16	June	9	78 Sheriff street	"	Vacated July 1; complied Sept. 14.
17	"	9	Avenue B, 50 feet south of 82d street	"	Complied July 2.
18	"	9	Avenue B, 100 feet south of 82 street	"	" July 6.
19	"	9	East 82d street, 100 feet east of Avenue B	"	Vacated July 1; complied Sept. 15.

No.	Date.	Premises.	Character of Premises.	Result.
20	June 16	East side Boulevard, between 79th and 80th streets	Stable	Vacated June 29; complied Sept. 22.
21	" 16	Southwest corner 112th street and Boulevard	"	Vacated July 9; complied Sept. 2.
22	" 23	331 East 35th street	"	Complied July 3.
23	" 23	West side Robbins avenue, first house south of No. 651	"	Vacated July 9; complied Sept. 23.
24	Aug. 25	322 East 24th street	"	Complied Sept. 13.
25	Sept. 1	163 West 29th street	"	" Oct. 7.
26	" 1	548 West 37th street (rear)	"	" Sept. 19.
27	" 15	601 East 136th street	"	" Oct. 9.
28	" 22	319 Delancey street	"	Vacated Oct. 1; complied Dec. 9.
29	" 22	321 Delancey street	"	Vacated Oct. 1; complied Dec. 9.
30	Oct. 6	233 East 9th street	"	Vacated Oct. 16; complied Dec. 1.
31	" 13	86 Thomas street	"	Complied Oct. 28.
32	" 13	61 Mangin street	"	Vacated Nov. 12; complied Dec. 9.
33	" 22	341 East 105th street	Vacant lot	
34	" 22	343 East 105th street	"	
35	" 22	345 East 105th street	"	
36	" 22	544 East 119th street	Stable	Vacated Nov. 5; complied Nov. 7.
37	" 22	244 East 104th street	"	Complied Nov. 9.
38	" 22	295 West 142d street	"	" Nov. 11.
39	Nov. 24	22 Watts street	"	Vacated Dec. 2.
40	" 24	24 Watts street	"	" Dec. 2.
41	" 24	East side Southern Boulevard, second house south of 137th street (rear)	"	Complied Dec. 7.
42	" 24	West side Bathgate avenue, first house north of 176th street	"	" Dec. 4
43	" 24	82 Bowery	Factory	" Dec. 2.
44	Dec. 1	446 East 149th street	Stable	Vacated Dec. 16.
45	" 1	Mott Haven canal		Case in litigation.

Summary.

Number of premises declared public nuisances		45
Nuisances abated	38	
Nuisances not abated	7	
		45

The beneficial result of the active work by the Board of Health in ordering houses vacated when the orders have not been complied with, and in declaring stables, etc., public nuisances, is seen in the increase in the number of orders that have been promptly complied with upon the owners being notified by an order of the Board to abate the nuisance.

In the year 1895 there were 32,833 orders issued by the Board of Health, of which 17,627, or 53 per cent., were complied with upon reinspection within five days. In the year 1896 there were 52,488 orders issued, of which 32,284, or 61 per cent., were complied with upon reinspection within a few days.

LIGHTS IN TENEMENT-HOUSES.

The provisions of chapter 567 of the Laws of 1895 require that "the owner or lessee of every tenement-house in the City of New York shall keep a light burning in the hallway upon each floor of said house from sunset until 10 P. M. throughout the year."

In order to ascertain if this requirement of the law had been complied with, night inspection of over 40,000 tenement-houses in the City of New York was required. To effect this, a night inspection by 150 of the Inspectors of this Bureau was made on March 26 to March 30, 1896, and the issuance of 14,000 orders to enforce compliance with the law was the result. The premises were reinspected, and where it was found that the order had not been complied with, notice of a suit was served upon the owners of 5,630 tenement-houses. These premises were again reinspected during the month of April, and it was found in all cases that the law had been complied with.

BAKERIES, FEED, DRUG AND LIQUOR STORES AND THE BOILING OF FAT IN TENEMENT-HOUSES.

The provisions of said act also required that " no bakery or place of business in which fat is boiled shall be maintained in any tenement-house which is not fireproof, and that no portion of any tenement-house shall be used for the storage of feed, hay or straw, except by permit from and under such conditions as may be prescribed by the Fire Department "; also, that " all transoms, windows and other openings leading into halls, or into rooms opening into halls, from bakeries or places of business where fat is boiled in tenement-houses shall be solidly closed with the same material as the walls or partitions in which openings exist. All transoms and windows opening into halls, or any portion of said floor in any tenement-house where paints, oils, spirituous liquors or drugs are stored or kept for sale or otherwise, shall be removed and closed up as solidly as the rest of the wall, and all doors leading into said halls or rooms, or such portion of said floor of said tenement-house used as aforesaid, shall be made fireproof."

During the past year inspections were made of all tenement-houses in the city which were occupied as bakeries, or other places of business where fat is boiled, feed stores, or where paints, oils, spirituous liquors or drugs are stored or kept for sale, with the following result:

Total number of bakeries in tenement-houses	583
Total number of tenement-houses in which fat is boiled (other than bakeries)	49
Total number of feed stores in tenement-houses	29
Total number of drug stores in tenement-houses	559
Total number of oil and paint stores in tenement-houses	311
Total number of liquor stores in tenement-houses	4,062

In a large number of cases it was found that the provisions of the law had not been complied with, and notices of suits have been forwarded and are at present in litigation.

INSTITUTIONS.

The condition of the various institutions in the city, incorporated for charitable purposes and for the care of orphan and destitute children and juvenile delinquents, have received very close attention. In two of them —namely, the Male Department of the Ladies' Deborah Nursery, situated at One Hundred and Forty-first street and Southern Boulevard, and the Female Department of the Ladies' Deborah Nursery, situated at One Hundred and Sixty-second street and Eagle avenue—the conditions were uch that the Board of Health had occasion to order them closed, and the hildren were removed to other institutions.

DISPOSAL OF MANURE.

In my Annual Report to the Board of Health for the year 1895 a very ull report was made in regard to the amount and manner of removing anure from the city. On June 1, 1895, the amendment of March 26, 895, to the Sanitary Code went into effect. The modification was as ollows:

> "To cause all manure and stable debris to be removed daily from such stable or stable remises, unless the same are pressed in bales, barrels or boxes, as hereinafter provided."

The improvement in the condition in the stables in the city, due to nforcement of this section of the Sanitary Code, is very marked.

Number of complaints received in the city below the Harlem river:

	1894.	1896.
umber of citizens' complaints	190	65
umber of complaints returned for orders	118	23
umber of complaints returned, no cause for complaint	72	42

Inspections made in February, 1895, and December, 1896, show the umber of stables and number of horses in the City of New York, below he Harlem river, to be as follows:

umber of stables	4,386
umber of horses	69,212

Inspection made in December, 1896, showed the number of

tables	4,649
umber of horses	73,746

All of the manure and stable debris of the City of New York below he Harlem river is received at the docks on the East and North rivers nd railroad depots at the locations designated by the Board of Health. There are fourteen of these locations. All persons receiving manure are required to have a permit from the Board of Health.

The following table shows the average daily receipts (in tons) and the condition in which the manure is received:

MONTH.	LOOSELY IN CARTS.	IN BARRELS.	IN BALES.	MONTH.	LOOSELY IN CARTS.	IN BARRELS.	IN BALES.
January	1,162.75	49.25	.33	July	734	43	11.33
February	1,113	72	4	August	807	34.25	3.33
March	1,064	94.75	8	September	749	39.25	2.33
April	1,110	155.25	10.33	October	992	34.25	2.33
May	976	115	6	November	1,132.75	48.75	1.33
June	962	57.75	5.33	December	1,145.25	44.25	.66

This gives an average daily receipt (in tons) throughout the year as follows:

Loosely in carts	996.39
In barrels	65.64
In bales	4.61

On the basis of 312 working days in the year, the total amount of manure and stable debris received at the dumps was 332,791.68 tons.

DEAD ANIMALS.

The intense heat during the month of August caused an unprecedented increase in the number of animals dying in the stables or upon the streets of the city. During the week of August 9 to August 15, inclusive, the total number of dead animals removed by the Contractor was:

Horses	1,330
Cats and dogs	3,411

The contractor was embarrassed in the work by the fact that many of his own horses died at this time. On the 12th day of August the following order was issued:

"*To the Chief Inspector of Division of Contagious Diseases:*

"SIR—Owing to the inability of the Contractor for the Removal of Dead Animals to remove the same from the streets of the city as rapidly as they die during the heated term, it will be necessary that the animals as they fall in the streets be properly disinfected and deodorized. You are hereby directed to have all of the Disinfectant Corps of your division discontinue their routine work and report with horses, wagons, etc., for special duty this afternoon, and instruct them to make a tour of the streets of the various districts to which they are assigned, and wherever a dead animal is found on the street, have dead animal thoroughly disinfected and deodorized, and repeat this action every four to six hours, or as often as occasion should require, until the contractor is able to remove the dead animal from the street.

"CHAS. F. ROBERTS, M. D.,
"*Sanitary Superintendent.*"

This abated the nuisance to a very great extent, and by the 17th of August all the dead animals had been removed.

Total number of dead animals removed from the streets during the year was	79,759

LEPROSY.

On October 9, 1896, I forwarded a communication to the Board of Health, as follows:

"There are at present in Riverside Hospital at North Brother Island five men suffering from leprosy. Names, ages, etc., as follows:

NAME.	NATIVITY.	DATE OF ADMISSION.	HOW LONG SICK.
William Bryan	West Indies	April 16, 1895	Unknown.
Lung Dung	China	Sept. 25, 1895	2 years.
Gerald Peters	St. Vincent's Island	Oct. 31, 1895	50 days.
Sam Loo	China	June 30, 1896	1½ years.
Frederick Fleming	Germany	Sept. 21, 1896	2 years.

"These men are confined to one pavilion, 24 by 60 feet, except in fair weather, when they are allowed to take exercise in a portion of the ground adjoining the same.

"Leprosy is a disease which is undoubtedly communicable, but most of the authorities of the present day are of the opinion that the same is due to infection and not to contagion, and communicable only in a slight degree in the earlier stages of the disease, and that is the condition of the above-named men.

"The prevailing sentiment of the laity and of many of the medical profession in regard to leprosy is founded on prejudice established by ancient writings and traditions.

"It is undoubtedly true that this infection is much more easily communicated from severe cases, or from those in the last stages of the disease; possibly in the same manner as phthisis. It certainly is not much more communicable than phthisis; and these cases being of a mild type, it is not right that they should be taken and segregated by themselves in this small compass. Three of them do not understand English. They are deprived of all society, except their own company and that of their attendant, and, in my opinion, this is wrong. If they were allowed to return to their own homes and friends in their present condition, I feel positive that no harm would accrue to those with whom they come in contact.

"This deprivation of their rights and contact with the world is a hardship and an injustice. They should be discharged, and I so recommend."

his communication was referred to the Sanitary Committee and by approved, and at a subsequent meeting of the Board their report ving the same was laid on the table, and the question in regard to re of lepers in the United States was brought before the Medical ty of the County of New York, and a committee was appointed to tigate the same, and a report was made by that committee to the cal Society of the County of New York, as follows:

" NEW YORK, December 28, 1896.

he Medical Society of the County of New York :

GENTLEMEN—Your committee appointed to report upon the contagiousness of leprosy in ork City, and the importance of its segregation here, has the honor to report as follows:

It is agreed that leprosy is probably an infectious disease.

A disease, though infectious, is not necessarily contagious.

In certain regions leprosy is prevalent or endemic. In these regions the disease is appa- communicated from individual to individual; that is, is contagious, though the mode of ion is unknown.

There are other regions to which lepers have long had more or less free access by immigra- nd in which numbers of them have lived for comparatively long periods, and yet that affords lence whatever of any tendency to propagation of the disease. The same exposure through roduction and proximity of lepers that in some regions has sufficed to cause a rapid and ve spread of leprosy in other places, though oft repeated and long continued, has never ed any appreciable effect injurious to the public health. Such favored regions comprise f the more highly civilized parts of the globe, including that in which we live.

It would appear, therefore, that other conditions than that of mere proximity are essential leprosy can be accounted a contagious disease. What these other conditions are, whether late to location, soil, climate, food, mode or habits of life, is unknown; but, with little it is because of their absence that this and other similarly favored localities have thus far ed exempt from any prevalence of leprosy. Judging from long experience of the past, er prospective danger there may be from this source, it is not such as to create alarm, and inly not imminent.

In regions where the disease is apparently on the increase through the development of new *not exotic*, it is a menace to the general community, and segregation may be justifiable and .

To adopt the principle of segregation here, and to apply it indiscriminately to all lepers, be unnecessarily arbitrary and, therefore, unjustifiable. It would be, on the part of the ities who should carry it out, tantamount to proclaiming the existence of a serious danger to nmunity, when in reality the danger is slight, and, by so much, would create an alarm that cessary and add to the popular prejudice against the disease and its victims that is already ve.

The indiscrimate enforcement of this measure would entail great and unnecessary injury nany lepers, especially to such as are so circumstanced as to be independent of public r. Moreover, there is reason to believe that in such cases confinement to a leprosary would the disease to pursue a less favorable course than it would pursue were the patient not ed of his liberty.

As to whether indigent lepers, dependent upon public charity, should be accorded the same ges in general institutions as are given to patients with other chronic infectious diseases, or be assigned exclusively to an institution set apart for them, is a question of expediency our municipal authorities must decide.

Inasmuch as lepers are not desirable additions to a community and are liable to become a charge, your committee deems it expedient that the quarantine and immigration authorities exercise their authority as far as possible to exclude all such cases.

" Respectfully submitted,
"(Signed) GEORGE HENRY FOX, M. D.,
" H. G. PIFFARD, M. D.,
" E. B. BRONSON, M. D.,
" A. A. SMITH, M. D.,
" GEORGE B. FOWLER, M. D.,
Chairman,
Committee on Leprosy.

MEDICAL INSPECTION OF SCHOOLS.

n October 3, 1896, I sent a communication to the Board, as follows:

I believe the greatest source of transmission of infectious and contagious diseases among n of this city is their contact one with the other in schools.

"This transmission, in my opinion, can be best overcome by an examination every morning of the children in the schools of this city by a Medical Inspector of the Board of Health.

"At the first glance this seems to be an almost insurmountable undertaking, when we consider the number of scholars taught in the schools in the City of New York. I am confident, however, that this work can be accomplished. It would not require the services of a physician in any school for more than from thirty to sixty minutes a day to examine those children who have been selected by the teachers in their respective classes as not appearing to them to be in good health. The selected ones could be examined by the physicians, and if found to be suffering from any illness whatsoever, obliged to return to their homes. If found to be suffering from any illness of a contagious character that required action on the part of the Board of Health, the child could be returned to its home and its name and address telephonically reported to the office of the Division of Contagious Diseases of the Board of Health, and the children visited at their homes by the Inspector of that district and properly cared for. The list of absentees could also be obtained and visited at their homes by these or the other Inspectors of the Department, to ascertain if their absence is due to contagious or infectious disease.

"In commencing this work, it is the younger children, that is, those attending the primary schools and the Primary Departments of the grammar schools and the parochial schools, which should first receive our attention.

"The report of the Board of Education shows the following:

"In the City of New York, below the Harlem river, there are—

Primary schools	47
Average daily attendance	24,863
Primary departments in grammar schools	100
Average daily attendance	81,597

"Sadlier's Catholic Directory shows that in the City of New York, below the Harlem river, there are—

Parochial schools	55
Average daily attendance	33,636

"In the schools having the larger attendance of scholars two physicians could be detailed to take charge, one in the boys' and one in the girls' department, and in the schools where only a small number of scholars attend, if in the same locality, a physician could visit two schools.

"To my mind this is perfectly feasible, and this work should be done. It will require the employment of about one hundred and fifty physicians, who should reside near the school to which they are assigned for duty. The number of school days in the year is two hundred, so that their services will only be required that number of days, which are during the first six and the last four months of the year.

"I, therefore, recommend that one hundred and fifty physicians be appointed by the Board of Health as Medical Inspectors of Schools, with salary at the rate of thirty (30) dollars per month for ten months in the year, to carry out the provisions of this report, and that the Board of Education of New York City, and the School Board of the Roman Catholic Church of the Diocese of New York be requested to co-operate and aid in the same."

Routine of Work to be Performed by the Medical School Inspectors in the Public and Parochial Schools in the City of New York.

The Inspector shall visit the schools daily when in session as soon after the morning opening as is convenient to the principal in charge of same, and examine all the children who have been separated by the teachers in charge of the different classes, and those pupils who are found too ill to remain in school he shall advise the teachers to send home for the observation and care of its parents and family physician. If a child who is thus sent home returns the next day with continued illness, the same action shall be repeated.

If, in the course of his examination, a pupil is found suffering from contagious disease, or it has been reported to him that the child has been in contact with contagious or infectious disease, or it shall be indicated by desquamation or otherwise that it has not fully recovered from such disease, the name, age and address of such pupil shall at once be telephonically communicated to the Chief of the Division of Contagious Diseases for such action as he may deem requisite.

The Inspector shall obtain from the principals the names and addresses of all absentees from the morning roll-call, and forward the same to the Division of Contagious Diseases.

The Medical School Inspector assigned for duty in the schools shall keep a record of the number of children daily inspected by him, and the names, ages and addresses of all children found by him suffering with any disease, and report the name, age and address of the child and the character of the disease semi-weekly, on a blank to be furnished by the Department, to the Chief of the Division of Contagious Diseases, and shall weekly make a summary of all work performed by him.

Where there have been several cases of scarlet fever, diphtheria or measles among the children of any class, the names and addresses of all absentees in that class should be obtained from the principal and forwarded to the Chief of the Division of Contagious Diseases, with a memorandum of the facts that may have come to the Inspector's knowledge in regard to the cases of contagious diseases.

It is understood that the Medical Inspectors are not to give professional advice in any case. They shall point out the need of professional advice in all cases in which the need exists. They must examine all children thought by their teachers to be ailing, and point out the need of professional treatment in cases in which, in his opinion, it is required. The treatment itself must be received from the family physician or the hospitals or dispensaries.

Duty of Principals in Charge of Schools.

It shall be the duty of the principals in charge of primary schools and of primary departments in grammar schools to set apart a place for the children who have been separated from the rest of the class by the teacher in charge, for examination by the Medical School Inspector. He shall aid the Inspector in such action as may be deemed necessary for the protection of the health of the other children of the school. The principal shall each morning prepare a list of all absentees from the school, and deliver the same to the Inspector at the time of his visit, for the purpose of having the Medical School Inspector forward the same to the Board of Health with a view to having the same compared with the list of locations of houses wherein contagious or infectious diseases have been reported to the Board of Health.

Duty of Teachers in Charge of Classes.

It shall be the duty of the teachers in the primary schools and in primary departments of grammar schools, at the time of morning roll-call, to select from their classes any child who appears to be ailing, or where, from any information they have received, they have reason to believe that the child has been in contact, in their family or otherwise, with any one ill with contagious or infectious disease. These children should be separated from the rest of the class in the room set apart by the Principal for examination by the Medical School Inspector at the time of his visit.

COMPLAINTS AND PERMITS.

During the year 1896 there were received from citizens 26,829 complaints. These were referred to the Chiefs of the different Divisions in the Sanitary Bureau for investigation and report.

During the year permits were issued as follows:

To consignees of vessels to discharge cargoes	2,097
To consignees to land rags (in bulk) under bonds	37
Miscellaneous permits	3,487
To scavengers to disinfect, empty and clean privy vaults	1,384

All of which is respectfully submitted.

CHAS. F. ROBERTS, M. D.,
Sanitary Superintendent.

NEW YORK, January 4, 1897.

To the Sanitary Superintendent :

SIR—I have the honor to present the following report, outlining the work done by this Division during the year 1896. Besides the ordinary routine investigation of citizens' complaints and reinspections of orders, some new features are presented.

Early in the year, in accordance with a law passed in the last Legislature, requiring lights to be kept burning in the hall on each floor of a tenement-house, a house-to-house inspection of the tenement-houses in the built-up portion of the city was made at night to determine whether the law had been enforced. As a result of that inspection, over 14,000 orders were issued and reinspected, and now it can be stated that the law in this respect is practically complied with.

There was also a systematic inspection twice made of all tenement-houses in which were located saloons, drug stores, bakeries and feed stores, to determine whether they had been made fireproof, in accordance with the regulations relating to such stores.

During the summer months, an investigation of the condition of the rear tenement-houses was made by the Sanitary Inspectors, and a large number reported for condemnation.

The Sanitary Police have completed a house-to-house inspection of all tenement-houses in the city twice during the year.

This year there have been 252 arrests made for violation of the Sanitary Code, more than the aggregate of the preceding three years.

A visit to the private schools throughout the city, for the purpose of securing information as to the average attendance, number of boarders, and whether located in tenement-houses, has just been finished.

Between 23,000 and 24,000 citizens' complaints and 11,000 contagious disease complaints have been investigated, and over 52,000 orders have been issued. Over 137,000 inspections and reinspections have been made by the Sanitary Inspectors and 410,000 by the Sanitary Police, making a grand total of 540,000.

This represents a great amount of labor, and taken in connection with the effect it has had in bettering the sanitary conditions of the community, it cannot but be regarded with a degree of satisfaction.

The importance of the work can be best appreciated when we consider what the consequence would be if this corrective influence were withdrawn for a short time, but these agencies, being constantly at work, must result in the improvement of the dwellings and their surroundings of the multitudes in this our great city.

It is our endeavor in all our efforts to observe a high standard in the character of the work performed, and to be as thorough as possible, in order that what is done may be of a permanent nature, and thus there are being established certain fixed conditions that mark an advance each year.

Following is a summary of the work performed in this Division :

The primary inspections have been as follows :

Summary of Inspections.

Tenement-houses	45,736	Stream	1
Lodging-houses	5,577	Canals	2
Private dwellings	4,220	Steamboats	4
Other dwellings	2,638	Fire-hydrant	1
Public buildings	79	Schools	46
Other buildings	1,197	Rivers	9
Manufactories and workshops	1,172	Pound	1
Stores and warehouses	6,570	Cemetery	1
Stables	1,547	Railroad and railroad cars	22
Offensive trade buildings	7	Alleyways	3
Sunken and vacant lots	1,885		
Public highways	331		71,743
Receiving-basins and public sewers	96	Reinspections	65,481
Dumps and dumping grounds	47		
Docks and piers	15	Total	137,224
Slaughter-houses	534		
Not found	2		

Number of cellars ordered to be made water-tight	528
Number of privy-vaults ordered abolished	201

rts received from the Inspectors of this Division, classified f complaint, are as follows :

LAINT.	CAUSE.	NO CAUSE.	TOTAL.	NATURE OF COMPLAINT.	CAUSE.	NO CAUSE.	TOTAL.
....	11,779	1,339	13,118	Cows, etc.	65	45	110
....	6,872	1,303	8,175	Fowls	241	34	275
....	1,544	433	1,977	Filth	13,492	1,457	14,949
....	7,513	154	8,067	Sunken and vacant lots	848	121	869
....	4	20	24	Streets, gutters and sidewalks	16	4	20
es	131	25	156	Sewers and receiving-basins	28	6	34
....	584	123	707	Dangerous buildings	7	6	13
....	62	2	64	Ash receptacles	470	133	603
....	59	13	72	Fire hydrants	5	...	5
....	8,039	945	8,984	Janitors	22	1	23
its	4,346	851	5,197	Docks and piers	....	1	1
osets	9,351	1,231	10,582	Miscellaneous	18	13	31
....	420	53	473				
....	168	21	189	Total	66,655	8,403	75,058
....	571	69	640				

ctions and reinspections	137,224

ctions on—

ınd reports forwarded for Board's orders	30,573
ınd reports forwarded Sanitary Superintendent	4,234
negative reports	9,891
s	27,045
al	71,743

ections on—

arded	58,695
ıs	6,786
al	65,481

to Court	640
to Department	5,482
ctors	41

OF THE WORK OF THE SANITARY POLICE FOR THE YEAR 1896.

pections and miscellaneous	408,176
and forwarded to the Sanitary Superintendent	21,496
and referred to the Sanitary Inspectors	4,289
e on complaint of citizens, and forwarded to the Sanitary Superin-	1,892
on overcrowding	182

Citizens' Complaints.

ınitary Superintendent	6,208
tary Superintendent ; complaint made and forwarded	1,916
tary Superintendent ; no cause for complaint	1,767
tary Superintendent ; nuisance abated	2,525

Communications.

ınitary Superintendent for examination and report	7
tary Superintendent with report of examination made	7

Orders for Reinspection.

tion, date of last report	103
ed from Sanitary Superintendent	35,367
ed to Sanitary Superintendent complied with	18,938
ed to Sanitary Superintendent not complied with	14,667
rom Sanitary Superintendent	52,742

Orders returned to Sanitary Superintendent complied with	31,470
Orders returned to Sanitary Superintendent not complied with	23,050
Held for reinspection, or while work is progressing	87

Orders from the Division of Contagious Diseases.

Under observation, date of last report	9
Received to stop work, close stores and keep premises under observation	150
Relieved from observation	150
Under observation	9
Night inspections of tenement apartments to report overcrowding	45,601
Complaints of overcrowding made and forwarded	213
Orders issued by the Board to reduce number of occupants in overcrowded apartments	213
Orders complied with	203
Orders not complied with	10
Letters delivered	2,707
Total officers	49
Water-closets ordered in lieu of privy vaults	5
Ash receptacles removed from outside stoop line	2,399
Scavengers' permits collected and forwarded to Sanitary Superintendent	1,043
Manure dump inspections	998
Lodging-houses inspected	1,254
Tenement-houses inspected, house-to-house inspection under the law	88,677
Tenement-houses inspected, not house-to-house inspection	101,457
Slaughter-house inspections	3,722
Stables inspected	15,010
Miscellaneous inspections and reinspections	148,709
Notices served directing burial of persons who died from contagious or infectious diseases	2,431
Postal Cards transmitted to the Department of Street Cleaning	44
Officers on special duty	13

Nature of Complaints and Violations reported by Sanitary Police.

	Complaints made.	Nuisances Abated by Personal effort.	Total.
Air shaft filthy, not covered or connected with house sewer	613	611	1,224
Area filthy and dangerous	1,746	1,422	3,168
Ash boxes in violation of Sanitary Code	5,051	2,415	7,466
Balusters and stairs dangerous	783		783
Cellar filthy	2,809	2,788	5,597
Cellar occupied as a place of dwelling or lodging	368	....	368
Cellar doors dangerous	36	....	36
Cellar not water-tight	16	....	16
Cesspools	51	....	51
Chimneys dangerous or obstructed	79	....	79
Clothes pole dangerous	15	....	15
Cows—no permit	24	....	24
Dock filthy	1	....	1
Dogs in violation of Sanitary Code	126	6	132
Drains obstructed or defective	194	....	194
Eaves gutters defective or dangerous	53	....	53
Fences dangerous	90	....	90
Fire escapes filthy or obstructed	71	644	715
Flooring broken, dangerous or filthy	1,323	216	1,539
Fowls—no permit	343	....	343
Fresh-air inlet obstructed	6	29	35
Goats—no permit	39	....	39
Hogs—no permit	5	....	5
Hydrant out of repair	45	....	45
Ice-box defective	43	....	43
Ice-box not connected with a properly trapped Croton supplied sink	5	....	5
Lodging-house—no permit	1	....	1
Leaders defective, obstructed or dangerous	375	....	375
Manure vault in violation of the Sanitary Code, or no permit	769	194	963
Pigeons	413	....	413
Pumps out of repair	24	....	24
Privy accommodation not sufficient	23	....	23
Privy vault full, offensive or out of repair	44	....	44
Privy house filthy or out of repair	1,066	687	1,753
Premises not connected with street sewer	26	....	26
Rabbits	38	....	38
Receiving basin full or offensive	73	....	73
Roof leaking or filthy	1,354	564	1,918
School sink out of order or neglected	335	919	1,254
Stable yard filthy, not paved, graded or sewer-connected	101	674	775
Stable in a tenement house	66	....	66

	Complaints made.	Nuisances Abated by Personal effort.	Total.
....	283	....	283
....	72	....	72
ed, defective	328	....	328
ctive or not	838	171	1,009
dangerous or	252	96	348
angerous....	81	2	83
filthy or ob-	59	8	67
ructed.......	....	31	31
ement-house	2	....	2
ucted or de-	549	2	551
noxious.....	1	....	1
vercrowded.	6	....	6
d, flushed or	320	....	320
langerous,not onnected....	276	18	294
tings danger-	16	....	16
of repair or	1,214	42	1,256
Water closets not trapped or ventilated.....	48	....	48
Water tanks filthy............	315	9	324
Walls and ceilings filthy or out of repair....................	5,733	....	5,733
Waste pipes obstructed, defective or not ventilated.........	847	....	847
Yard filthy, not properly graded or sewer-connected..........	1,836	3,472	5,308
Yard pavement out of repair....	217	....	217
Halls not properly ventilated...	182	....	182
Inside rooms not properly ventilated......................	84	....	84
No appliances to receive and distribute water on every floor of tenement...	172	....	172
Rags stored in a tenement-house —no permit.............	63	....	63
School kept in a tenement-house —no permit.................	32	....	32
Halls not lighted...............	6,331	15	6,346
Factories in tenements.........	58	....	58
Totals.................	38,858	15,035	53,893

Very respectfully,

ALFRED LUCAS,
Chief Sanitary Inspector.

NEW YORK, January 4, 1897.

tary Superintendent:

eg to submit herewith the report of the work performed by
n of Contagious Diseases for the year 1896. The following
how the number of cases of contagious diseases annually
the Department since 1888, upon which the work of the
Medical Inspectors attached to this Division is based:

ntagious Diseases Reported to the Health Department Annually Since 1887.

	1888.	1889.	1890.	1891.	1892.	1893.	1894.	1895.	1896.
....	311	2	5	21	378	464	770	41	5
....	7.279	6,443	9,544	11,980	12,780	7,122	9,493	8,203	11,931
....	7,188	8,849	3,087	7,442	7,048	5,764	4,768	3,808	4,807
....	6 491	6,489	4,350	4,874	4,654	6,468	9,155	9,925	11,241
....	1,108	1,414	1,100	1,342	1,140	1,008	792	965	1,013
....	4	....	4	9	241	473	....	....	3
....	27,381	23,197	18,090	25,668	26,241	21,299	24,978	22,942	29,000

Deaths from Contagious Diseases Annually Since 1887.

	1888.	1889.	1890.	1891.	1892.	1893.	1894.	1895.	1896.
Small-pox	81	1	2	2	81	102	154	10	1
Measles	591	470	730	663	864	393	584	793	718
Scarlet fever	1,361	1,242	408	1,220	977	551	541	468	401
Diphtheria	1,914	1,686	1,262	1,361	1,436	1,970	2,359	1,634	1,555
Typhoid fever	364	397	352	384	400	381	326	322	296
Typhus fever	4	....	....	1	45	200	....	....	....
Totals	4,315	3,796	2,754	3,631	3,803	3,597	3,964	3,227	2,971

Mortality Percentage in Cases Reported Annually Since 1887.

	1888.	1889.	1890.	1891.	1892.	1893.	1894.	1895.	1896.
Small-pox	26.05	50.00	40.00	9.52	21.43	21.98	20.00	24.39	20.00
Measles	8.12	7.30	7.65	5.53	6.76	5.52	6.15	9.67	6.02
Scarlet fever	18.92	14.04	13.30	16.39	13.86	9.56	11.35	12.29	8.34
Diphtheria	29.49	25.98	29.01	27.93	30.85	30.46	25.77	16.46	13.83
Typhoid fever	32.85	28.08	32.00	28.61	35.09	37.80	41.16	33.37	29.22
Typhus fever	100.00	.....	.....	11.11	18.67	42.28	.....	.....	.....
Totals	19.28	16.36	15.22	14.15	14.49	16.89	15.87	14.07	10.24

Figures for 1896 up to 12 M. December 30, both for cases and deaths.

The notable increase in the number of reported cases during the year is not, in my opinion, due to any unusual prevalence of these diseases, but rather to an evident desire on the part of the medical profession of the city to co-operate with the municipal authorities in the prevention of this class of diseases, as shown by a more general compliance with the requirements of the Sanitary Code with reference to reporting cases of this nature. The hospitals of this city have, with few exceptions, regularly sent lists of cases of typhoid fever patients in response to a specific request sent early in the year, and I believe that we have this year, more nearly than ever before, an approximately correct number of cases of this disease. It is an interesting fact that an analysis of the results of investigation of reported cases of typhoid fever, where an intelligent history could be obtained, shows that over 65 per cent. of the cases were the result of infection which had occurred outside of the city, or had resulted from infection by imported cases. This fact would go far, were it at all necessary, to prove the purity of the water and milk supply of the city.

The work of the Division during 1896 has been mainly directed toward the prevention of diphtheria and scarlatina, and to this end all the efforts of the District Inspectors have been expended in securing proper isolation of each case, and the prompt removal to the hospital of those cases where adequate facilities for proper care and isolation could not be provided. The result has proved that, where ordinary intelligence is found in the family of the patient, either scarlatina or diphtheria may be safely allowed to remain in a tenement or apartment-house if, after the other inmates of the house have been notified of the existence of the case, and the door of the infected apartment placarded, frequent inspections are made by the Inspector to insure isolation of the patient until he necessary disinfection has been performed by the Department employees.

The city is to be congratulated that not one case of small-pox of ocal origin has been reported during the past year, and but three cases of typhus fever have come to the knowledge of the health authorities. The three cases of typhus fever occurred in persons who for some months prior to illness had resided in this city, and yet the most painstaking nvestigation failed to discover the source of infection. The first two cases occurred in one family, husband and wife, with a history of exposure o a case of so-called cerebro-spinal meningitis which had recovered. All precautions were taken in the disinfection of the house of these three persons, and no secondary cases were discovered during the three weeks' urveillance on the premises. The third reported case was found in a city hospital, and our efforts failed to connect this case with the other two ases. No secondary cases were discovered, and all attempts to locate he point of infection failed. In each of these three cases the diagnosis was the result of a study of the clinical aspect of the case, corroborative evidence from a pathological standpoint being prevented by the recovery of all cases. Within two months past, the Widal method of diagnosis of typhoid fever, now employed by the Bacteriological Laboratory, has resulted in a prompt and accurate differentiation of a so-called case of yphus reported to the Department by one of the municipal hospitals, the subsequent history of the case confirming the test of Widal.

The increase of over 11 per cent. in the reported cases of diphtheria, and over 5 per cent. in scarlatina has made it necessary to employ from ive to ten extra physicians during the year, in order that adequate surveillance might be maintained of these cases, and that obedience to the mandates of the Department might be enforced. The physicians thus employed are selected from those previously employed on the Summer Corps.

The manufacture of clothing and other articles (as cigars) in infected apartments is undoubtedly a potent factor in the spread of contagious and infectious diseases, and the Division has been, many times during the year, obliged to enforce, with the assistance of the Police Department, its requirements in this class of cases. It is a rule of the Department that when a case of contagious disease has been reported in a family engaged in the manufacture of goods of any kind, that work shall be stopped and the goods retained on the premises until the necessary disinfection by the Department employees has followed recovery of the patient. If this plan works too great hardship for the wage earners, the Department offers to remove the sick person to the hospital, disinfect the premises and goods, and allow work to be resumed, or to leave the child and remove the working materials to the disinfecting station for disinfection, and then return them to some other place previously ascertained to be free from contagious disease.

During the year special and important work has been performed by the Division (Medical Inspector George S. Lynde, M. D., being detailed for the purpose), with a view to discovering how great a factor in the spread of contagious disease the public schools might be, and the result of this inspection is embodied in a special report to the Board of Health, which has resulted in an appropriation for the employment of a corps of Medical School Inspectors, whose work, it is believed, will result in the early detection and isolation of a large number of cases which have not before been considered as requiring exclusion from school attendance.

It is with great satisfaction that I call your attention to the mortuary statistics of the year, which shows that, while the population has been constantly increasing, and the number of cases reported during the year has increased nearly 24 per cent., the death returns show that the death rate from this class of diseases is lower than ever before in the history of the city. It is only fair to assume that, where the continued lowering of the death-rate has been noted for a number of years, the cause must not be looked for in the character of the epidemic of the present year, but rather in the improved methods of treatment and the success which has resulted in the efforts to secure proper isolation, and the attempts to prevent the spread of contagious diseases.

The vaccinations performed by the Division, while fewer in number than last year, have been made with the liquid glycerinated lymph furnished by the Bacteriological Laboratory, and have resulted in an unusually large percentage of successes, and it is doubted whether the work of any previous year has yielded the same amount of immunity from variola which has resulted from the use of this greatly improved virus. Owing to the increased demands on the corps of physicians of the Division, in connection with contagious diseases, only house-to-house and central office vaccination has been performed, and the readiness with which the people of this city accept the services of our vaccinating corps shows the popular confidence in the methods of the Department, and the general conviction of the adequacy of vaccination as an absolute prevention, or at least a modification of this justly-dreaded scourge of former years.

The Summer Corps of fifty physicians employed during the months of July and August rendered unusually effective service, and contributed in no small degree, by the faithful discharge of their duty, to the low death-rate noted during the remarkably heated months from the diarrheal diseases of childhood ; and it is pleasant to note that the continued work of this corps is resulting in a more liberal education of the poor of the city in the matters pertaining to the more careful treatment of sick infants. This result has been obtained not only by the advice of the Inspectors, but also by the dissemination of medical suggestions printed in various languages native to recently arrived immigrants.

The Ambulance Corps, Disinfectors, Diagnosticians, Veterinarian and office force have all contributed in their respective duties to the excellent work of the Division, the annual report of which will bear favorably a critical comparison with the record of any previous year in the history of the Department.

The following is a summary of the work performed in this Division :

Cases of Contagious and Infectious Diseases Reported.

Measles	11,850	Malarial fever	7
Diphtheria	11,093	Pertussis	148
Croup	306	Parotiditis	58
Scarlet fever	4,728	Erysipelas	31
Cerebro-spinal meningitis	109	Leprosy	3
Small-pox	5		
Chicken-pox	566	Total	29,909
Typhoid fever	1,002		
Typhus fever	3		

Work Performed by Inspectors of Vaccination.

Number of primary vaccinations	21,340	Vaccination certificates issued	12,996
Number of revaccinations	61,481	Reports to Chief Inspector	789
Number of visits to sick children	540		

Work Performed by Medical Sanitary Inpectors.

Number of cases visited	79,389	Total inspections	73,429
Number of cases for special diagnosis	3,081	Not found	488
Days (24 hours) as Diagnosticians	1,598¼	School notices sent	7,206
Inspections of tenement-houses	64,059	Vaccination certificates issued	144
Inspections of hotels	379	Visits to doctors and undertakers	673
Inspections of schools and institutions	2,539	Visits to Department	4,026
Inspections of private houses	4,338	Reports to Chief Inspector	8,565
Miscellaneous inspections	1,626		

Work Performed by Disinfecting Corps.

Number of houses visited	14,901	Pieces infected goods on hand	242
Infected rooms fumigated	26,822	Persons removed to hospital on account of contagious diseases	1,592
Infected rooms disinfected	26,955	Dead bodies removed to Morgue	136
Pieces infected goods removed by Department	57,399	Days on ambulance	1,423
Pieces infected goods returned by Department	46,752	Times ambulances, etc., were fumigated	3,057
Pieces infected goods disinfected	47,195	Reports to Chief Inspector	4,206
Pieces infected goods destroyed	10,442		

Work Performed by Veterinarian.

Number of diseased animals examined	982	Glandered horses destroyed	245
Inspections made	1,841	Reports to Chief Inspector	94
Heads of cattle examined	12,930		
Post mortems on cattle	129		

Miscellaneous Work.

Number of certificates of vaccination issued	14,105	Total number of inspections	90,171
Prescriptions written	592	Total number of certificates of vaccination issued	27,245
Prescriptions filled	592		
Reports to Chief Inspector	1,938		

Respectfully submitted,

(Signed) CHAS. S. BENEDICT, M. D.,

Chief Inspector.

THE DIVISION OF FOOD INSPECTION, OFFENSIVE TRADES AND MERCANTILE ESTABLISHMENTS.

To the Sanitary Superintendent:

SIR—This Division of the Department is the one which is charged with—

1st. Inspection and investigation of all food and drink, drugs, medicines, or any substances or materials which may be dangerous to life and health (including the constant examination of our water supply); all chemical analyses or investigations required, either in this Division or the Department, or by request of the Coroners, District Attorney, or Police Department, and the general supervision of all places where food and drink are prepared or manufactured, and the examination of all animals killed for food at the abattoirs.

2d. With the inspection and necessary supervision of all factories, establishments, places or vehicles, which, by reason of the operations carried on, produce odors, noises or vibrations, or discharge dust, smoke, or any gas or material or substance detrimental to life and health.

3d. With the inspection of mercantile establishments, as required by chapter 384, Laws of 1896, and with the issuing of certificates to children who work in factories or manufacturing establishments, as required by chapter 991, Laws of 1896.

4th. With the investigation and subsequent recommendations as to the advisability of granting or denying applications made to the Board of Health to—

(*a*) Sell milk.

(*b*) Slaughter animals for food.

(*c*) Carry on any business or operation (offensive trades) which may become detrimental to life and health.

(*d*) Transport fat and bones and offal.

(*e*) Transport manure.

(*f*) Drive cattle.

(*g*) Keep cows.

(*h*) Permit employment of children (in mercantile establishments and factories).

(*i*) Use basements for employment of women, etc.

5th. With the investigation and report of complaints made by citizens as to matters over which this Division has supervision, as already described, and of similar complaints which may be sent to the Health Department from other Departments of the City Government.

The work has been performed in somewhat the same way as during the previous years, with the exception that the Division has been greatly enlarged, new and important duties charged to it, and certain other duties transferred to it from other Divisions. The three new duties are:

Permit system for the sale of milk.

The inspection of milch cows (tuberculin test).

The inspection of mercantile establishments.

Chapter 384. An act entitled to regulate the employment of women and children in mercantile establishments, and to provide that the same shall be enforced.

This became a law April 23, 1896, with the approval of the Governor.

The Division is in charge of 1 Chief Inspector and 1 Assistant Chief Inspector, who is also Chief Inspector of Mercantile Establishments; the work in the different bureaus being performed by—

(*a*) Laboratory—1 Chemist, 1 Assistant Chemist and 1 Milk Inspector and Assistant Chemist.

(*b*) Inspections of Milk—There are 11 Milk Inspectors, 1 being detailed to assist in Laboratory, 2 to assist in examination of cows by tuberculin test and 1 to superintend the issuing of permits to sell milk. The Milk Inspectors engaged in store-to-store inspections are assisted by Sanitary Officers, who act as witnesses and assist in the work.

(*c*) Inspections of Meat—4 Meat Inspectors: 2 to examine meat and poultry sold at large markets and commission houses below Fourteenth street; 2 in slaughter-houses—1 for the east and 1 for the west side—ice-houses, etc., above Fourteenth street.

(*d*) Inspections of Fish—2 Fish Inspectors: 1 for Fulton Market and wholesale houses, commission houses, etc.; 1 for retail stores, stands and carts.

(*e*) Inspections of Foods and Fruits—3 Inspectors: 1 for wholesale and commission houses, stands, vessels, etc.; 2 for retail stores, stands, etc., also the general examination of all food products other than milk, meat or fish.

(*f*) The examination of cows within the city limits, as to their condition, particularly the tuberculin test—2 Inspectors, who are assisted temporarily by 1 Meat Inspector, 2 Milk Inspectors and 2 Sanitary Officers.

(*g*) Mercantile Establishments—In which the recent laws of 1896, relating to the employment of women and children under specified ages and in certain places, are enforced—1 Chief Inspector and 14 Assistant Inspectors, 10 of whom are women.

The clerical force consists of 2 Clerks for work in bureaus (*a*) to (*f*) and 3 Clerks for the Mercantile Establishments inspection (*g*); 2 office boys, 1 for general office work and 1 for Laboratory exclusively.

With the exception of these Clerks, the Inspectors and Chemists make itemized weekly reports of the work performed by them.

These reports are consolidated and form the weekly report of the Chief Inspector, which is submitted to the Sanitary Superintendent for examination and subsequent forwarding to the Board of Health.

MILK INSPECTION.

Great attention has been paid to the general inspection of milk, and in place of examining as to its quality at places where it is brought into the city, the efforts of the Inspectors have been directed, particularly during the hot weather, to the tenement-house districts, and in this way more "store inspections" were made and the quality of the milk sold in such localities very greatly improved.

The stores selling milk in the neighborhood of the public schools are carefully watched, not only to insure pure milk, but that the glasses used to serve the milk to children, and the utensils and the stores as well are clean ; that the ice-boxes are properly trapped, etc.

Sections of the Code defining adulteration in milk, cream and condensed milk were adopted, and the use of antiseptics to preserve milk, cream and condensed milk was again investigated, with the result that certain large firms dealing in condensed milk and cream were found to be offering for sale cream and condensed milk to which borax had been added.

The investigation showed that this had been added without the knowledge of the parties, in one case even the original adulterator, at the creamery in the country, came forward and acknowledged the offense, but the result has been that these facts having become known, not a single case was found since that time, even during the hot weather.

The quality of the milk has greatly improved over last year, fewer adulterated samples have been found, and the percentage of adulteration has been less. The general improvement in the quality of the milk is shown in the following table :

	1895.	1896.
Samples found to be adulterated	393	233
Number of complaints (citizens)	156	134
Original complaints by Inspectors	45	
Number of quarts adulterated milk destroyed	2,677	161
Number of arrests	408	220
Number of trials	364	*243

* 23 left over since last year.

And it must be remembered that three of the Inspectors who were engaged in the store inspection of milk during 1895 have, during the greater part of this year, been engaged largely in regulating the permit system and in the inspection of milch cows for the detection of tuberculosis, and yet the number of store inspections, as has been stated, were in excess over 1895.

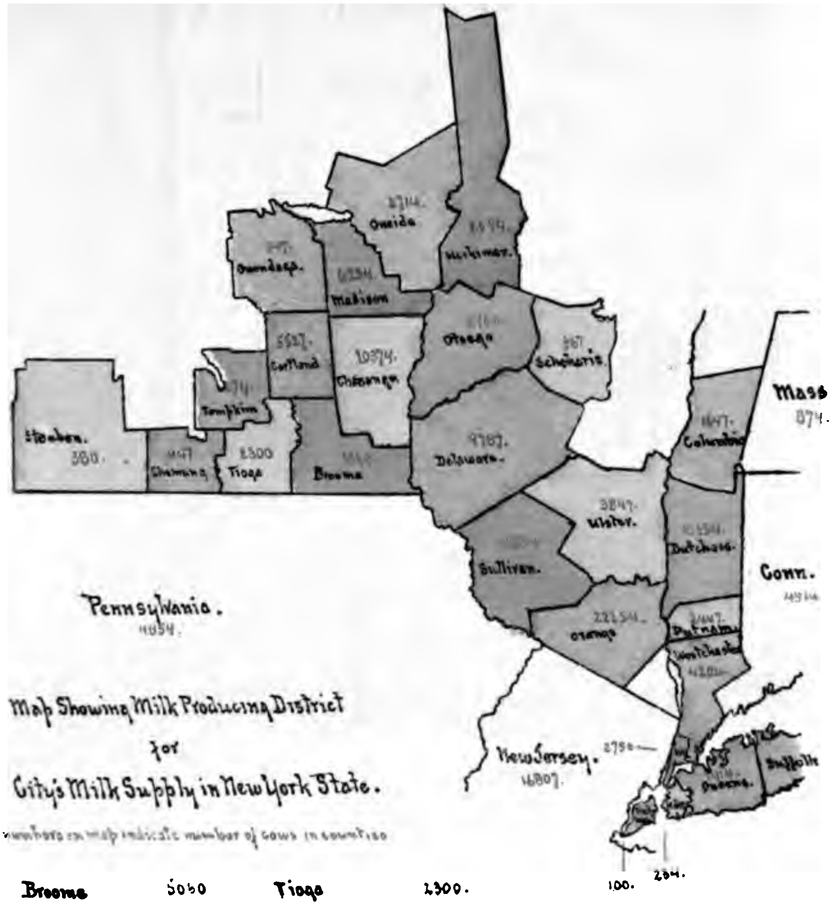
That is, during 1895, ten Milk Inspectors were engaged in the actual inspection of milk, while, in 1896, seven have been so employed.

The following is the daily average of milk, cream and condensed milk shipped to New York City :

Milk	728,612	quarts.
Cream	16,000	"
Condensed milk	8,600	"

The milk supply of this city is obtained principally from New York State, New Jersey, Connecticut, Pennsylvania and Massachusetts ; the amount produced being in the order named.

The accompanying map shows the districts supplying milk in the State of New York, New Jersey, Connecticut, Massachusetts and Pennsylvania, and the accompanying table indicates the daily amount brought over the different railroads, etc., from all localities, together with the estimated number of cows in each county of this State and in other States :



Map Showing Milk Producing District
for
City's Milk Supply in New York State.

Red numbers on map indicate number of cows in counties

Broome	5060
Chemung	447.
Chenango	10374.
Columbia	1547.
Cortland	6527.
Delaware	9787.
Dutchess	10554.
Herkimer	2594.
Kings	234.
Madison	6234.
New York	2756.
Oneida	2714.
Onondaga	347.
Orange	222.64.
Otsego	2960.
Putnam	2447.
Queens	1414.
Richmond	100.
Schoharie	567.
Steuben	380.
Suffolk	100.
Sullivan	4834.
Tioga	2300.
Tompkins	274.
Ulster	3847.
Westchster	4200.
Connecticut	4514.
Massachusetts	874.
New Jersey	16807.
Pennsylvania	4854.
Total.	130701.

Daily Average Amount of Milk, Cream and Condensed Milk Received in New York City during the Month of November. Expressed in Quarts.

RAILROADS, ETC.	OUTSIDE STATES.				NEW YORK STATE BY COUNTIES.										
	Pennsylvania.	New Jersey.	Connecticut.	Massachusetts.	Broome.	Chenango.	Chemung.	Columbia.	Cortland.	Delaware.	Dutchess.	Herkimer.	Kings.	Madison.	New York.
Erie	6,240	12,440	....	....	14,160	....	1,040	...	....	2,920	....	....	....	....	....
New York Central & Harlem	....	....	....	....	....	....	....	7,800	....	....	42,760	....	....	....	....
Ontario & Western	2,800	....	1,880	....	....	29,280	....	1,480	....	27,160	4,800	....	....	16,960	....
Northern	....	....	....	....	....	....	....	....	....	....	8,760	....	....	....	....
West Shore	....	....	....	....	....	....	....	....	....	28,120	....	800	....	....	....
New Haven	....	....	25,200	5,240	....	....	....	....	....	....	....	....	....	....	....
Delaware, Lackawanna & Western	1,000	9,000	....	....	16,200	32,960	1,640	....	33,160	520	....	15,760	....	20,440	....
New Jersey Central	....	8,720	....	....	....	....	....	....	....	....	....	....	....	....	....
Homer Ramsdell Trans. Co	....	....	....	....	....	....	....	....	....	....	175	....	....	....	....
Susquehanna	....	29,680	....	....	....	....	....	....	....	....	....	....	....	....	....
Lehigh Valley	19,080	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Local sources	....	1,487	....	....	....	....	....	....	....	....	...	....	1,250	....	40,000
Total quarts	29,120	61,327	27,080	5,240	30,360	62,240	2,680	9,280	33,160	58,720	56,495	16,560	1,250	37,400	40,000
Number of cows (estimated)	4,853	10,221	4,513	873	5,060	10,373	447	1,546	5,526	9,786	9,416	2,760	208	6,233	4,000

Daily Average Amount of Milk, Cream and Condensed Milk Received in New York City during the Month of November. Expressed in Quarts—Continued.

RAILROADS, ETC.	NEW YORK STATE BY COUNTIES.															
	Otsego.	Oneida.	Onondaga.	Orange.	Putnam.	Queens.	Richmond.	Schoharie.	Steuben.	Suffolk.	Sullivan.	Tioga.	Tompkins.	Ulster.	Westchester.	Totals.
Erie	....	....	....	98,160	....	....	....	....	2,280	....	9,680	2,800	....	....	....	....
New York Central & Harlem	....	....	....	....	7,920	....	....	....	....	....	....	....	....	....	16,920	....
Ontario & Western	4,400	4,640	....	8,040	....	....	...	....	....	....	17,280	....	....	800	....	....
Northern	....	....	....	....	6,760	....	....	....	....	....	....	....	....	....	5,280	....
West Shore	....	....	....	....	....	....	....	....	....	...	....	....	....	22,280	....	....
Delaware, Lackawanna & Western	13,360	11,640	2,080	....	....	....	....	2,200	....	....	....	9,000	1,600	....	....	....
Long Island	....	....	....	....	....	480	....	....	..	320	....	....	....	....	....	....
Homer Ramsdell Trans. Co	....	....	....	27,320	....	....	....	....	....	....	....	....	....	....	....	....
Lehigh Valley	....	....	....	....	....	....	....	....	....	....	....	2,000	....	....	....	....
Local sources	....	....	....	....	....	5,000	60	....	....	....	....	....	....	....	....	....
Total quarts	17,760	16,280	2,080	133,520	14,680	5,480	60	2,200	2,280	320	26,960	13,800	1,600	23,080	22,200	753,212
Number of cows (estimated)	2,960	2,712	346	22,253	2,446	914	10	366	380	54	4,493	2,300	266	3,847	3,700	122,862

Of the above total quantity of milk, 87.7 per cent. is produced in New York State, or	630,445 quarts, the product of	102,404 cows.
Included in the above is 16,000 quarts of cream, to give the equivalent in milk add	64,000 quarts, the product of	10,666 cows.
Also included in the above is 8,600 quarts of condensed milk, to give the equivalent in milk add	19,800 quarts, the product of	3,300 cows.
Equivalent to a daily average from New York State of	714,245 quarts, the product of	116,370 cows.

The number of cows producing our daily milk supply, I have estimated as follows:

Cows in city	3,200
Cows outside of city	112,370

This is estimated on basis of an average yield of six quarts per cow.

Milk, cream and condensed milk are usually sent to the city in cans holding forty quarts, and in quart or pint bottles, packed in boxes; and as the cars used in transportation are especially adapted for the purpose, being provided with ice-boxes and heating apparatus to prevent souring in summer or freezing in winter, and the highest possible rate of speed maintained, our milk supply is delivered generally in good condition, even from the more remote points. The facilities provided by the railroads to the shippers, viz., ice-boxes at shipping points and agents to care for the milk while awaiting transportation, also tend to keep the milk in good condition, so that although the greatest distance from which the milk is now shipped is nearly 300 miles, and some 18 hours is required for transit, yet, as has been stated, the milk, etc., is still fresh and in good condition when delivered to the consumer.

It is probable, however, that the limit of distance is nearly reached for allowing 18 hours from the shipping point to the city, the trains leaving at 6 A. M.; the milk shipped was that of the previous evening (12 hours before shipment). The consumers also receive, or at all events use it, nearly seven (7) hours after its arrival; so altogether such milk is at least 36 hours old before it is used for food.

Milk is delivered at depots in the city and over ferries from points outside the city as follows:

Harlem and Hudson River Railroads, Forty-seventh street and Lexington avenue.
New York and Northern Railroad, High Bridge.
New York, New Haven and Hartford Railroad, One Hundred and Thirty-second street and Willis avenue.
New York, New Haven and Hartford Railroad, foot of Harrison street.
Ontario and Western Railroad, Jay street and West Forty-second street.
Erie Railroad, Chambers street and West Twenty-third street.
West Shore Railroad, Jay street and West Forty-second street.
Delaware, Lackawanna and Western Railroad, Christopher street and Barclay street.
Long Island Railroad, East Thirty-fourth street and James Slip.
New Jersey Central Railroad, Liberty street.
Homer Ramsdell Transportation Company, Pier foot of Franklin srreet.
New York and Susquehanna Railroad, Desbrosses street and Cortlandt street.
Lehigh Valley Railroad, Desbrosses street and Cortlandt street.
Ferry from Astoria to foot of East Ninety-second street.
Ferry from Brooklyn to foot of East Twenty-third street.
Ferry from Brooklyn to foot of East Tenth street.
Ferry from Brooklyn to foot of East Houston street.
Brooklyn Bridge.

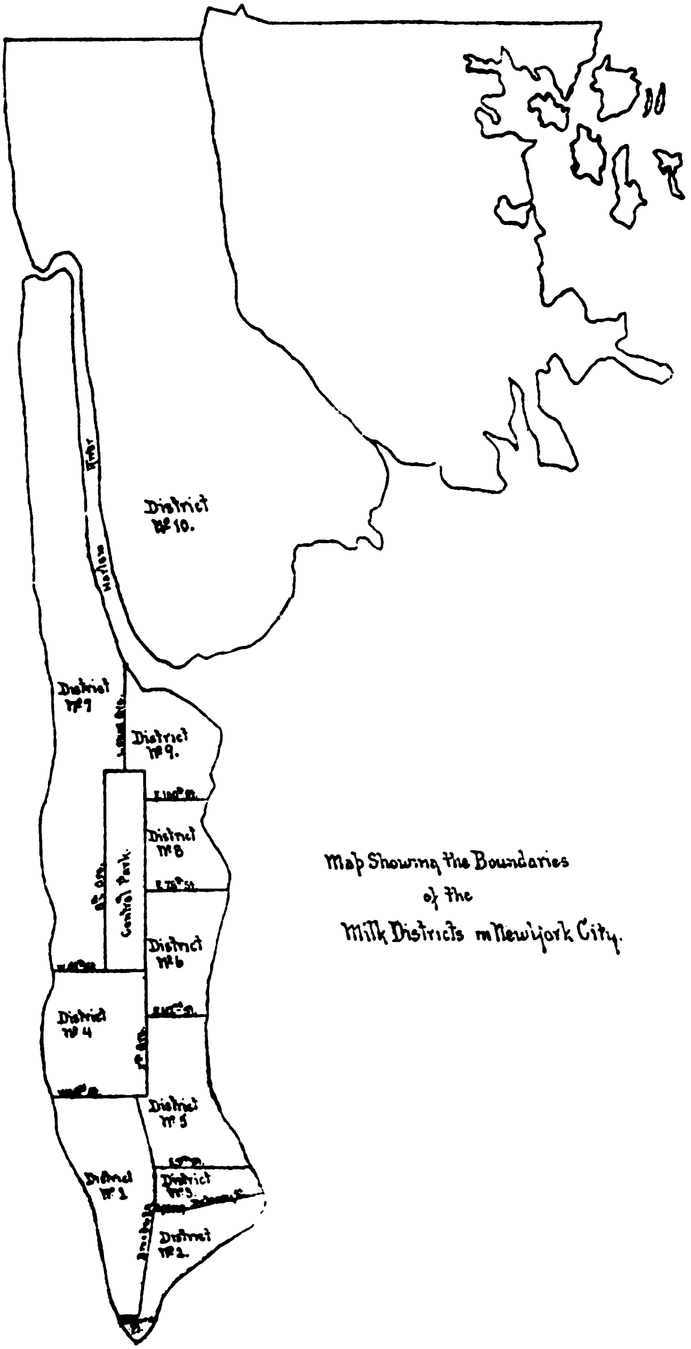
Methods of Inspections.

There are nearly 7,000 places where milk is sold, the amount varying from a few quarts to many hundred daily, and except where the amount is very small, it is kept and sold from the 40-quart can in which it is shipped to market. This can is in summer usually kept in a tub containing ice and water, or in an ice-box; the practice of putting ice into the milk to cool it has almost ceased, as the venders have become aware that this practice is equivalent to adulterating the milk with water as soon as the ice melts. The ice-box, should one be used, must be sewer-connected, according to Sanitary Code.

While it is desirable to inspect the milk at every place where it is sold as often as possible, yet it has been thought necessary to pay greater attention and to inspect more frequently in what might be called the tenement-house districts, particularly in hot weather, than in localities less thickly populated; also to examine frequently those stores selling milk in the neighborhoods of our public schools, not only to detect adulterations, but to prevent the use of improper or dirty utensils, to see that suitable care is taken to clean the glasses between each sale, especially during the lunch hour.

That the buttermilk, for which there is a large demand, is in good condition, and that in general great care and cleanliness is exercised.

In order to ascertain that every place where milk is sold is under our supervision, that suitable permits have been obtained by the venders, etc., there is each year a careful census made of the places in the city where milk is sold, and the city is then divided into districts, as in the accompanying map.



Map Showing the Boundaries
of the
Milk Districts in New York City.

A card index is kept for reference, on the cards of which the inform tion, as in illustration, is recorded :

Baker.	**Sells 30 Qts.**	**Doe, John, 3309 First Ave.**
Pemit No. 1000.		O Name of Dealer, John Jones, 675 East 150th St.

The inspection is conducted as follows :

An Inspector is assigned to a district. Each Inspector has a disti guishing letter given to him, as A, B, C.

The first inspection he makes is recorded as A, 1 ; B, 1 ; C, 1, et The results of each inspection are thus recorded under the distinguishin letter and number, as are any subsequent proceedings, such as numberin a sample if one is taken, etc.

Each Inspector is provided with a suitable bag containing a lact meter and thermometer, both of which have a distinguishing numbe they having been tested as to their accuracy by the Chemists, and th record of such tests kept for reference ; the number of the instrumen the date tested, the results and the name of the Chemist who performe the test are tabulated, so that should any dispute arise as to the accurac of any instrument used this record can be referred to.

He is also provided with inspection book, which is numbered wit consecutive numbers (see diagram), indicating the proper number of th inspection :

26

Date..Hour.........................
Street and Number..
Name of Owner...
Business...
From whom purchased...
Number of Quarts sold Daily..

Can No.	Amount of Contents.	Lactometer.	Temperature.	Lactometer at 60°.	Appearance.	Odor.	Taste.
1							
2							
3							
4							

No. of Inspection, N 1626.
Marks on Cans.

REMARKS.

—also a stub-book numbered with consecutive numbers of milk sampl taken, as follows :

HEALTH DEPARTMENT, CITY OF NEW YORK.
DIVISION OF FOOD INSPECTION AND OFFENSIVE TRADES.

Date..
No. of Inspection...
Inspector...
Witness...
Name of Owner...
Address...
Quarts Destroyed..
Adulteration..
Sample No..........................

HEALTH DEPARTMENT, CITY OF NEW YORK.
DIVISION OF FOOD INSPECTION AND OFFENSIVE TRADES.

Date..
No. of Inspection...
Inspector...
Witness...
Name of Owner...
Address...
Quarts Destroyed..
Adulteration..
Sample No..........................

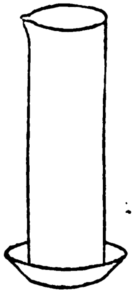
—as required by chapter 338, Laws of 1893.

Six-ounce bottles for samples to be delivered to vender, both sides of this bottle perforated with a small hole to permit sealing with wire and lead seal; wire and seals and brad-awl and sealing iron, this latter having "Health Department, N. Y." on reverse of die, and the distinguishing letter of the Inspector, as A, B, C, etc., on the obverse side.

Four-ounce wide-mouth bottles for milk samples to be delivered to Department Chemist.

A testing cylinder to hold the milk under examination, towels, labels, etc. Each Inspector is required to wear his Official Badge at all times when on duty.

The cylinder used to contain the milk under examination is made in the following shape:



The tin cup at the bottom holding a little alcohol, this enables the Inspector to readily warm the milk to sixty degrees Fahrenheit by pouring a little alcohol in this cup, igniting same and stirring contents, while burning, with the thermometer, until the desired temperature is attained.

Chapter 338 of the Laws of 1893 requires every inspector taking a sample of milk for analysis to deliver to the vender or his representative a sealed sample and in the presence of a witness.

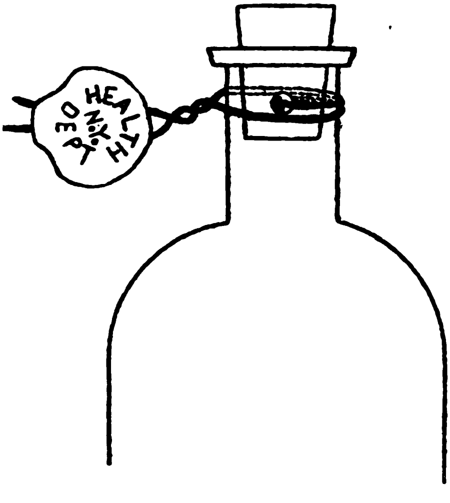
In order to comply with this law, it has been found convenient to have an officer, detailed from the Sanitary Police, to accompany the Inspector and so act as the witness and generally assist.

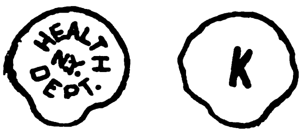
The Inspector, before the examination of the milk, either in a store or upon a cart, as in the course of delivery to customers, ascertains, 1st, if the owner has a permit to sell milk, and such facts as are necessary to fill in the blanks on his inspection book, and also such information as might become necessary, should subsequent legal steps be taken, viz.: If e milk under examination is actually for sale; if there is a dipper in e can containing the milk; where the can is located, etc.

Having recorded such information on his inspection book, he next roceeds, by thoroughly stirring the milk, to obtain a fair sample, which transferred to the testing cylinder for examination. The temperature now ascertained, and if that be within a few degrees of 60 degrees ahrenheit, he obtains the lactometric standing as follows:

He stirs the milk to be tested so that a fair sample can be taken. arms or cools enough milk to 60 degrees Fahrenheit to fill the testing ylinder. He then inserts the lactometer in the milk in the testing ylinder, being careful not to wet that part of the stem above the milk, nd observes where it floats. Pure milk will not fall below the 100 egree mark on the lactometer at 60 degrees temperature, but he must member that skimming the milk will make the lactometer float higher nd the addition of water or cream may make it sink lower than 100 egrees, but when the appearance of the milk upon the lactometer is noted e cannot mistake watered milk for milk to which cream has been added, or pure milk for milk from which the cream has been removed, as in kimmed milk. In other words, if the lactometer floats below 100 degrees nd the milk looks thin, water has been added. If it floats above 100 egrees and the milk looks thin, it may be skimmed, or skimmed and atered. But if it floats above 100 degrees and looks creamy and yellow nd sticks to the glass, he can be reasonably sure that it is pure. Good verage milk will indicate about 109 degrees on the lactometer at a mperature of 60 degrees Fahrenheit.

If from this examination he believes the milk to be adulterated by e addition of water or by the removal of part of the cream, or should e taste, odor, etc., indicate some other form of adulteration, the six-unce bottle, having holes through the neck, is filled from the testing ylinder, the cork inserted, a wire passed through the holes in the neck of e bottle and the cork, then twisted around the bottle, the blank lead seal ipped over the ends of wire and sealed with sealing iron, as in diagram.





Upon the bottle he fastens the label required by chapter 338 by means of gum which is on the label part of stub-book leaf; this label, filled out as required by law, and in the presence of the officer, delivers this sealed and labeled sample to the vender or his representative.

The 4-ounce wide-mouthed bottle is now filled with the milk from the cylinder, a label pasted upon it on which the number of the inspection and sample number is written. This latter sample being the one taken for delivery to the Department Chemist. Should more than one sample be taken, each bottle delivered to the vender is marked with the sample number on its label by means of a marking diamond. This prevents the soaking off of a label from one sample bottle and transferring it to one of the others, which might not be adulterated, so that on the trial, if one took place, there would be a descrepancy between the results of the analysis of the sample of milk made by the Department Chemist and those obtained by some chemist employed by the vender.

If the milk is found to be apparently pure, only the record of the result of the inspection is made, and the Inspector proceeds to the next place where he intends to inspect the milk.

Besides these samples, each Inspector obtains every week at least three (3) samples of cream and three (3) of condensed milk, from different dealers in his district, samples being given to the vender; but with no preliminary examination. The cream is obtained to ascertain whether antiseptics have been used to preserve it.

The condensed milk is obtained for the same reason, and also to determine whether it was made from skimmed or partly skimmed milk.

After obtaining a sample, the Inspector returns to headquarters and delivers it to the chemist for analysis, the method of delivery being as follows:

Upon arrival at the office, he fills out a card, prepared for subsequent card indexing, as in the diagram.

Form G 23-1897. C. R. No. 3188.

Page No. 336. Health Department City of New York. Permit No. 8096.

3d Division (Food Inspection, Offensive Trades and Mercantile Establishments).

Inspection No. R565. Sample No. 55. Date, Jan. 31, 1897. Time, 10 A. M.

Name, Doe, John. s Business, Grocer. Years in Business, 10 years.

Address, 1200 East 16th st. Who in charge, Doe, John.

From whom purchased, D. Water, 186 Rock st. Qts. sold daily, 40.

Can No.	Contents	Lact.	Temp.	Lc't at 60°	Appearance, etc.	Can No.	Contents	Lact.	Temp.	Lc't at 60°	Appearance, etc.
1 2	35	100°	32°	91°	Thin taste, flat.	3 4					

Can Marks.

1	2	3	4
P. H. 4			

Lact. No. 583.

Ther. No. 601.

Witness, Officer Roe.

Dipper in Can? Yes.

Citizen's Complaint No. 1230.

Held on Bail 1st Dist. Court, $100. 2/4/97.

Result of Trial, 2/10/97. Fined $150 at Court of Special Sessions.

Was Can Wired? No.

Location of Can? In ice-box at rear of store.

Date Received.............................To Inspector.............................

Time.............................○

Offense.

1st.....................

2d.....................

3d.....................

4th.....................

Inspector.............................

Analysis, Can No.

Water.............................

Fat.............................

Total Solids.............................

Solids not Fat.............................

Results.

....

....

....

Approved :

....

Sanitary Superintendent.

....

Assistant Chemist.

....

Chief Inspector.

—except he does not at that time fill in the vender's name. (The *s* at name of vender or representative indicates that proof of ownership was obtained.) He then delivers the sample, labeled with sample number and inspection number (only) to the Chemist, who signs and dates the card. This is returned to the clerk for entry in the record book and indexed, a sample page of which is given below:

No................

Inspector.............................

Analyst.............................

Date obtained.................

Date delivered.................

Date reported.................

Obtained from...

....

Reason for obtaining sample...

....

ANALYSIS.

Lactometer at 60° Fahr.....................

Equiv. to Specific Gravity.....................

Reaction to Litmus Paper.....................

Odor.....................

Remarks.....................

....

....

....

....

Water.....................

Fat.....................

Sugar.....................

Casein and Albumin.....................

Salts.....................

....

Total Solids.....................

Solids not Fat.....................

Fat by Lactoscope.....................

The data obtained from the card being copied in it, together with the name of the vender, this being taken from the stub of the "bottle label book," which stub is delivered with this card.

At the end of forty-eight hours after reception of sample the card is delivered to the Chemist, who indorses upon it the results of the analysis and returns it to the Chief Inspector, who, after careful examination, stamps on it "Arrest," or "Do Not Arrest." The results of the analysis, etc., are entered in the Milk Book, also this decision of the Chief Inspector.

Date Received, Jan. 31st, 1897.	O	To Inspector, Feb. 4th, 1897, 10.00 A. M.
		Offense.
Time, 12 M.		1st..............................
		2d ....
Inspector Brown.		3d ....
Analysis, Can No. 1.		4th..............................
Water, 89.31%..................		*Results.*
Fat, 3.59%		Solids 10% low.
Total Solids, 10.69%.............		Borax and Formalin. Negative.
Solids not fat, 7.10%............		....
Reaction. Normal.		Approved:
		CHARLES F. ROBERTS, M. D., *Sanitary Superintendent.*
EDMUND CLARK, *Assistant Chemist.* Feb. 2d, 1897.		EDWARD W. MARTIN, Feb. 2d, 1897. *Chief Inspector.*

He stamps "Arrest" if the total solids are 5 per cent. or more below the legal standard of 12 per cent.; or if the amount of fat contained is 10 per cent. or more below the legal standard of 3 per eent., or, as in condensed milk, if the amount of fat contained is 10 per cent. or more below the legal standard of fat (condensed milk must contain fat equivalent to 25 per cent. of the total milk solids found); or if the cream, milk or condensed milk contains any antiseptic or foreign substance.

Should the adulteration be less, however, than in the cases cited, "Do Not Arrest" is stamped upon the card. This card is now forwarded to the Sanitary Superintendent, who approves or disapproves the decision of the Chief Inspector and returns the same.

The Inspector is then notified to appear at the office, and the card delivered to him, with instructions for further procedure.

Although this may appear complicated, yet usually only a few hours over the 48 required elapse between the delivery of the sample for analysis and the obtaining of the warrant, should sufficient adulteration be detected for this course to be pursued.

The warrant for the arrest is obtained in the Police Courts by means of an affidavit made by the Inspector, the form being as follows:

STATE OF NEW YORK, } *ss.*:
City and County of New York, }

of No Street, in the City of New York, being duly sworn, says that he is over the age of twenty-one years, and is a Sanitary Inspector of the Board of Health therein, especially detailed to the inspection of Milk; that on the day of in the year 189 at premises number in the City of New York, the said premises being a place where Milk was then kept for sale, one did then and there unlawfully keep, have and offer for sale three quarts of impure and unwholesome Milk, which had been and was then and there watered, adulterated, reduced and changed by the addition of water or other substance, or by the removal of cream therefrom, and that such impure, unwholesome, watered, adulterated, reduced and changed Milk, was then and there, by the said , unlawfully held, kept and offered for sale, in violation of the provisions of the Sanitary Code then and there and at all times thereafter in force and operation, and especially in violation of the provisions of a section and ordinance of such Sanitary Code which was duly passed and adopted by the Board of Health of the Health Department of the said City of New York, and by said Health Department at a meeting thereof, duly held in said city, on the twenty-third day of February, 1876, and on the third day of December, 1895, in the manner and language following, to wit:

" Resolved, That, under the power conferred by law upon the Health Department, the fol-
" lowing additional section to the Sanitary Code for the security of life and health be and the same
" is hereby adopted and declared to form a portion of the Sanitary Code :

" 'No. 186—No Milk which has been watered, adulterated, reduced, or changed in any
" ' respect by the addition of water or other substance, or by the removal of cream, shall be
" ' brought into, held, kept, or offered for sale at any place in the City of New York, nor shall
" ' any one keep, have or offer for sale in the said city any such Milk.' "

" Resolved, That, under the power conferred by law upon the Health Department, the fol-
" lowing additional amendment of the Sanitary Code for the security of life and health be and
" the same is hereby adopted and declared to form a portion of the Sanitary Code.

" Resolved, That section 186 of the Sanitary Code be and the same is hereby amended so as
" to read as follows :

" 'Section 186. No Milk which has been watered, adulterated, reduced or changed in any
" 'respect by the addition of water or other substance, or by the removal of cream, shall be
" 'brought into, held, kept or offered for sale at any place in the City of New York ; nor shall
" 'any one keep, have or offer for sale in the said city any such milk.

" 'The term "adulterated," when so used in this section, means:

" 'First—Milk containing more than eighty-eight per centum of water or fluids.

" 'Second—Milk containing less than twelve per centum of milk solids.

" 'Third—Milk containing less than three per centum of fats.

" 'Fourth—Milk drawn from animals within fifteen days before or five days after parturition.

" 'Fifth—Milk drawn from animals fed on distillery waste, or any substance in a state of
" 'fermentation or putrefaction, or on any unhealthy food.

" 'Sixth—Milk drawn from cows kept in a crowded or unhealthy condition.

" 'Seventh—Milk from which any part of the cream has been removed.

" 'Eighth—Milk which has been adulterated with water, or any other fluid, or to which has
" 'been added, or into which has been introduced any foreign substance whatever.' "

That said ordinance was thereafter duly published once a week, for two successive weeks, in the City Record, a daily official newspaper and journal published in said city, to wit : In the issues of such newspaper of the twenty-fourth day of February, 1876, second day of March, 1876, December 5, 1895, and also of December 12, 1895, and that said ordinance was, at the time of the violation alleged herein, in full force and operation in said city and county of New York.

Sworn to before me the day }
of 189 }

The dealer, upon being arrested, usually gives bail and is tried at Special Sessions or General Sessions.

The Inspector is required to keep thoroughly informed as to all matters relating to milk, and upon such information varies the time of inspection, the order of places visited, etc.

If he finds that certain wholesalers are apparently delivering adulterated milk, or even that of an inferior quality, he takes such steps as may be necessary to substantiate this suspicion.

At all times of the year, except when the weather is so cold as to freeze the milk, one Inspector at least is detailed to examine the milk as delivered to the consumer or retailer, early in the morning. Also, from time to time, inspections are made of the milk, etc., at the railroad depots and at the ferries when it is brought into the city.

The policy of the Department is to endeavor to fix the crime upon the guilty one, as far as possible. Of course when the milk is adulterated outside of the city, the person in whose possession it was at the time of the inspection is held liable; but in all cases the attempt is made to trace up the original adulterater, as far as possible.

Beside the card index list of dealers, a similar record is kept of all violations and convictions.

Thus it can be ascertained at once whether the case in hand be the first (1st) or second (2d) or other offense.

Wholesale Dealer.	Sells 1,000 Qts.	Water, Daniel, 1044 Forsyth St.
Nov. 30th...	'87.........	S. S., $100.00.
Mch. 14th...	'96.........	S. S., $150.00. O

At the end of each day the Inspector writes on a suitable blank, headed as below:

No.	Date.	Name.	Location.	Permit No.	Time.	Temp.	Lac.

—the result of his day's work. This is forwarded by mail, reaches the office in the morning and is from time to time verified by a reinspection of the places recorded, by another Inspector who has been selected to act as "Roundsman" to check and verify the work.

At the end of the week, a report—summary of the week—is made out and delivered in person at Headquarters at 9 A. M. Mondays, as in sample given:

HEALTH DEPARTMENT OF THE CITY OF NEW YORK,
SANITARY BUREAU,
NEW YORK,........................189

To the Chief Inspector of the Division of Food Inspection and Offensive Trades:

SIR—I have the honor to submit the following Report of the work performed by me in the Inspection of Milk for the week ending Saturday,.....................................189

Sunday..
Monday..
Tuesday..
Wednesday...
Thursday..
Friday...
Saturday...

	SUN.	MON.	TUES.	WED.	THURS.	FRI.	SAT.	TOTAL.
* Number Inspections								
" Specimens Examined								
"								
" Citizens' Complaints Received								
" Citizens' Complaints held over since last Report								
" Original Complaints by Inspectors								
" Citizens' Complaints Returned for Orders								
" Citizen's Complaints Returned as Negative								
" Citizens' Complaints under Observation								
" Days at Court or Department								
" Special Day Inspections								
" Early Morning Inspections								
" Nights Special Work								
" Quarts Adulterated Milk Destroyed								
" Days in Country or at Laboratory								
" Arrests								
" Held on Bail								
" Trials at Special or General Sessions								
Amount of Fines								

Respectfully submitted,

....
Milk Inspector.

Trials at Special or General Sessions.

Name.	Location.	Date of Trial.	Adulteration.	Court.	Fin

Arrests at Police Court.

Date of Inspection.	Name.	Location.	Adulteration.	Date of Arrest.	Amount of Bail.	District Court.	Held Trial.

Adulterated Milk Destroyed.

Name.	Location.	Date of Inspection.	No. of Quarts Destroyed.	Lactometer at 60°.	Character of Adulteration	Can Mark.

Date.	Name.	Location.	Quarts Sold Daily.	Temp.	Lac.

he daily reports being inserted, these form the weekly report of the ctor, which is examined and filed for reference.

ıe officers accompanying the Inspectors are changed every two , and the milk district every two weeks. At the end of the year nspector has examined a number of times the milk sold in every n the city, and becomes by this method conversant with the milk ion of the entire city.

Permit System.

system of granting permits to venders of milk is one that has ntemplated for some years past. The benefits derived from it are ed that, in connection with the application of the tuberculin test cows, we now have a system of milk inspection which is almost t, both in theory and practice, as is possible at the present day the present force. The permit is in force during the pleasure of the Board of Health, and is revoked on the second trial and conviction for the sale of adulterated milk, the first conviction being followed by a warning that a repetition of the offense would be followed by a revocal of the permit.

It was believed that this permit system would greatly assist in—

1st. Preventing the sale of milk from cows improperly fed and cared for, and from cows suffering from disease.

2d. Preventing the sale of adulterated milk.

3d. Preventing the improper handling of milk, such as bottling upon the streets, etc., and we find in fact that those ends have been generally accomplished, except as to the milk supply from cows outside the city.

The system is carried out as follows:

In order to sell milk a permit is required by section 221 of the Sanitary Code. These permits are of two kinds:

1st. To sell from stores.

2d. To sell from wagons.

1st. From stores—The permits may be issued to—

(*A*) Stores which obtain the milk from points outside the city, and are owned by persons having creameries, dairy farms, etc.

(*B*) Stores which obtain the supply from within the city.

In either case a white blank, No. 1, is filled out by applicant, and if facts are as stated, particular attention being paid to locations and conditions of ice-box, etc., the permit is granted.

This application blank is given below:

No.......

APPLICATION (STORE) NO. 1.

To the Board of Health of the Health Department of the City of New York:

The undersigned hereby applies for a permit to sell fresh and condensed milk in the City and County of New York, and makes the following statement, in accordance with the laws, rules and regulations of the Board of Health of the Health Department of the City and County of New York:

Fresh Milk.

Name....................................
Business....................................
Location....................................
Quarts sold per day....................................
*From whom purchased....................................
Location....................................
Time of delivery....................................
Marks on can....................................

Condensed Milk.

*From whom purchased....................................
Location....................................
Quarts sold per day....................................
Time of delivery....................................
Where is fresh or condensed milk kept during sale?....................................
How is ice-box connected with sewer?........
Where located?....................................

---

* If purchased or obtained from farmer, milk agent, creamery, condensary, or from farm belonging to applicant, fill in Special Information Blank No. 3.

Signed..
Address..

Dated, New York,..............189..

For wagons much the same course is followed, except in regard to information. The blank, No. 2, is here given:

No..........

APPLICATION (WAGON) No. 2.

To the Board of Health of the Health Department of the City of New York:

The undersigned hereby applies for a permit to sell fresh and condensed milk in the City and County of New York, and makes the following statement, in accordance with the laws, rules and regulations of the Board of Health of the Health Department of the City and County of New York:

Fresh Milk.

Name....................................	Time when entering the city................
Business..................................	Over what ferry or road, or from what depot...
Location..................................	Marks on cans..............................
No. of Wagon..............................	Name of driver.............................
Quarts sold per day.......................	Residence..................................
* From whom purchased.....................	

Condensed Milk.

* From whom purchased.....................	Where is fresh or condensed milk kept during sale?..................................
Location..................................	How is ice-box connected with sewer?........
Quarts sold per day.......................	
Time of delivery..........................	

---

* If purchased or obtained from farmer, milk agent, creamery, condensary, or from farm belonging to applicant, fill in Special Information Blank No. 3.

Signed..

Address...

Dated, New York................189

If under (*A*) an additional blank No. 3 is given to applicant:

No.......

SPECIAL INFORMATION BLANK No. 3.

Milk purchased or obtained from farmer, milk agent, creamery, condensary, or from farm belonging to applicant.

Name of Milk Agent.............	....	....	Time Shipped.................	....	....
Residence......................	....	....	What Milking Shipped.........	....	....
Name of Farmer, Owner of Creamery or Condensary....	....	....	Time in Transit..............	....	....
			No. of Cows..................	....	....
Town...........................	....	....	Breed........................	....	....
County.........................	....	....	Condition....................	....	....
State..........................	....	....	Food.........................	....	....
Shipping Station...............	....	....	Housing......................	....	....
Railroad.......................	....	....	If in the City...............	....	....
County.........................	....	....	Permit No....................	....	....
State..........................	....	....	Water Supply for Cows, and where obtained............	....	....
No. of Cans per Day............	....	....			
Marks on Cans..................	....	....			

Signed..

Address...

Dated New York......................189....

—and if the number of farms, etc., is large, or creameries are the source of supply, the following blank is given to applicant:

Owner of Creamery............Town (P. O. Address)............County........State........

What Milking is Shipped.......Shipping Station...................Railroad................

What time is Milk Shipped..........How many hours in transit—on train......

Water Supply......Marks on Cans......No. of Cans per day......No. of Quarts in Bottles.....

NAME OF FARMER.	NO. OF COWS.	QUARTS DELIVERED DAILY.	BREED OF COWS.	CONDITION.	FOOD (full particulars).	HOW ARE COWS HOUSED.	WATER FOR COWS.	WATER SUPPLY FOR WASHING CANS.

Should the application be granted, a permit is issued for stores, as follows:

Health Department of the City of New York,
Criminal Court Building,
New York, ..., 189...

Permit No........

.... is hereby authorized to sell Milk, Fresh and Condensed, at No......................... under the laws, rules and regulations of the Board of Health of the Health Department of the City and County of New York.

This permit is not transferable to any person or location other than above, and must be kept posted at all times in a conspicuous place in this store, and is revocable at the pleasure of the Board.

By order of the Board of Health.

CHARLES G. WILSON,
President.

Emmons Clark,
Secretary.

Countersigned, Edward W. Martin,
Chief Inspector, Food Division, etc.

And for wagons:

Health Department of the City of New York,
Criminal Court Building,
New York, ..., 189...

Permit No........

.... residing at .... is hereby authorized to sell Fresh and Condensed Milk from Wagon No........, in the City and County of New York, under the laws, rules and regulations of the Board of Health of the Health Department of said City and County. This permit is revocable at the pleasure of the Board.

By order of the Board of Health.

CHARLES G. WILSON,
President.

Emmons Clark,
Secretary.

Countersigned, Edward W. Martin,
Chief Inspector, Food Division, etc.

This permit is void if used for any cart except the one designated on the face.

Driver's name..

Residence..

Not transferable.

In all cases great attention is paid to the care and handling of the milk, and each applicant is given a book of instructions, as follows:

Rules and Regulations of the Health Department of the City of New York for the Sale and Care of Milk. February, 1896.

EXTRACT FROM SANITARY CODE OF LAWS GOVERNING THE SALE OF MILK.

Section 186. No milk which has been watered, adulterated, reduced or changed in any respect by the addition of water or other substance, or by the removal of cream, shall be brought into, held, kept or offered for sale at any place in the City of New York, nor shall any one keep, have or offer for sale in the said city any such milk.

The term "adulterated" when so used in this section means:

First—Milk containing more than eighty-eight per centum of water or fluids.

Second—Milk containing less than twelve per centum of milk solids.

Third—Milk containing less than three per centum of fats.

Fourth—Milk drawn from animals within fifteen days before or five days after parturition.

Fifth—Milk drawn from animals fed on distillery waste, or any substance in a state of fermentation or putrefaction, or on any unhealthy food.

Sixth—Milk drawn from cows kept in a crowded or unhealthy condition.

Seventh—Milk from which any part of the cream has been removed.

Eighth—Milk which has been adulterated with water or any other fluid, or to which has been added, or into which has been introduced any foreign substance whatever.

Sec. 207. Any milk found to be adulterated, either by the addition of water or other substance, or by the removal of cream, or which has been brought into, or is held or offered for sale, in the City of New York contrary to the provisions of section one hundred and eighty-six of the Sanitary Code, may be seized and destroyed by any Inspector or other officer of this Department authorized to inspect milk.

SEC. 221. No milk shall be received, held, kept, offered for sale or delivered in the City of New York without a permit, in writing, from the Board of Health, and subject to the conditions thereof.

Regulations.

1. Milk shall not be kept for sale or stored in any room used for sleeping or domestic purposes opening into the same.

2. Milk must not be transferred from cans to bottles or other vessels on streets or on ferries or at depots, except when transferred to vessel of purchaser at time of delivery.

3. Milk shall not be sold in bottles except under the following rules :

Bottles must be washed clean with hot water solution of soap, or soda or some other alkali, and then with hot water before filling with milk.

Bottles must not be filled except at the dairy or creamery, and in the city only in rooms so situated as to prevent the contamination of the milk by dust from the streets or other impurities.

Bottles must not be washed or filled with milk in any room used for sleeping or domestic purposes or opening into the same.

4. The vessel in which milk is kept for sale must be so protected by means of a suitable cover or covered receptacle, and so placed in the store as to prevent dust from the street or other impurities falling into it.

5. Store permits must be posted in stores so that they can be easily seen at all times.

6. Wagon permits to be carried on the wagons at all times when engaged in the sale, transportation or delivery of milk.

7. The number of wagon and the number of permit, the latter to be preceded by the words "Health Department Permit," must be painted on both sides of the wagon in letters two (2) inches in length and one-half (½) inch in width, and in some contrasting color to that of wagon.

8. If any changes are made in the information given on application blank, the Department must be immediately notified.

Rules for Handling and Keeping Milk.

1. Milk should be kept in some place where dust and other impurities cannot fall into it, such as a box with tight-fitting cover ; preferably an ice-box.

2. The milk should be kept at as low a temperature as possible, not above 50° Fahrenheit.

3. After the day's sales are over, the measures and utensils used in the sale of milk should be thoroughly cleaned with boiling water, to which a small amount of soda has been added in the proportion of one tablespoonful of washing soda to a gallon of water.

4. The overflow pipe from the ice-box in which the milk is kept must not be connected directly with the drain pipe or sewer, but must discharge into an open, water-supplied, properly-trapped, sewer-connected sink (see section 217 of the Sanitary Code).

5. The ice-box in which the milk is kept should be cleaned, by scrubbing out with hot soda solution, made as in No. 3, at least twice a week.

6. In selling milk, stir up the contents of the can thoroughly before measuring out the amount desired. This will prevent unintentional skimming. In this way the last quart of milk sold from the can will contain as much cream as the first quart sold.

7. It sometimes happens that in cold weather the milk may be delivered to the dealer more or less frozen. If such is the case, detach the ice from the side of the can and gently heat the contents until the ice is all melted. If there is much ice in the can it is absolutely necessary to do this before selling the milk, otherwise the liquid part dipped out and sold at first will contain more of the solid part of the milk and cream, while the ice remaining and consisting principally of water, will after a time melt, and the result will be milk containing more water than pure milk, and this might be enough to appear as though the milk had been adulterated with water.

8. Do not place ice in the milk if it is desired to cool it or keep it cold, as the ice will melt, and you will then have adulterated the milk with water.

Suggestions for Testing Milk.

(By the Cream Gauge).

Fill the cream gauge one-half full with water, at a temperature of 120° Fahrenheit, to which has been added a few drops of a strong solution of washing soda. Then, after stirring up the contents of the can thoroughly, fill the gauge to the top mark with the milk. Shake well and place in very cold water (say 40° Fahrenheit). In about thirty minutes the cream will have risen and the percentage can be read off, remembering that the result observed must be multiplied by two, as one-half (½) water and one-half (½) milk was used. Example : 8 per cent. of cream was observed by this test ; multiplying this by two would be 16 per cent., which would be the true amount of cream contained in the milk by this test. Good milk should show by this test 14 to 18 per cent. of cream.

(By the Lactometer).

To test for water the lactometer can be used, as follows: Stir the milk to be tested so that a fair sample can be taken. Warm or cool enough milk to 60° Fahrenheit to fill the testing cylinder. Insert the lactometer in the milk in the testing cylinder, being careful not to wet that part of the stem above the milk, and observe where it floats. Pure milk will not fall below the 100° mark on the lactometer at 60° temperature. It must be remembered that skimming the milk will make the lacometer float higher, and the addition of water or cream may make it sink lower than 100°, but if the appearance of the milk upon the lactometer is noted, no one can mistake watered milk for milk to which cream has been added, nor pure milk for milk from which the cream has been removed, as in skimmed milk. In other words, if the lactometer floats below 100° and the milk looks thin, water has been added. If it floats above 100° and the milk looks thin, it may be skimmed, or skimmed and watered. But if it floats above 100° and looks creamy and yellow and sticks to the glass, you can be reasonably sure that it is pure. Good average milk will indicate about 109° on the lactometer at a temperature of 60° Fahrenheit, and show about 14 per cent. of cream by the cream test given above.

By order of the Board of Health.

CHARLES G. WILSON,
President.

EMMONS CLARK,
Secretary.

A book is kept (see example given).

NUMBER OF PERMIT.	DEALER'S NAME.	LOCATION.	DATE ISSUED.	REMARKS.
1000	John Doe....................	No. 1500 Third avenue.......	2/25/96	

—by means of which, knowing the number of the permit, the owner's name and facts relating to the granting of permit are at once ascertained.

The number of the permit is also recorded upon the cards in the card index, of such dealers (see example).

Retail Dealer.	Sells 120 Qts.	Doe, John, 836 W. 42d St.
9388. 3034.	10/13/'96 10/13/'96	○ Farmers in Pennsylvania.

Beside this, the information obtained from the application blanks of wholesalers is entered upon cards and arranged as follows (example of card given):

N.Y., Sus. & W.R.R.	8 Hrs.	Stillwell, James, Milford, Pike Co., Penn.
B. O. B. 13. 100 Qts.	Durham. 20. Well.	Port Jervis, Orange Co., N. Y. A. M. and P. M. 7.00 P. M. John Doe, 836 W. 42d St., N. Y. C. ○

The cards are first sorted as to railroads, then as to stations, then alphabetically, so that the names and addresses, amount of milk produced, etc., for all localities can be ascertained at a glance.

For instance, a milk dealer named John Smith obtains his supply from the Erie Railroad from Goshen. Looking at Erie Railroad cards we find

Goshen, and the farmers supplying John Smith are A., B., etc., and we find on the appropriate cards the number of cows, quarts of milk given, character of water-supply, time of shipment, delivery, etc.

During the past year the following has been accomplished :

Permits to Sell Milk.

Total number of store permits issued	7,339
Total number of wagon permits issued	1,641
Number of wagon permits held for examination of ice-boxes	205
Number of wagon permits held for examination of dairy farms	76
Number of store permits held for examination of dairy farms	49
Number of store permits held for consideration	251
Number of store permits revoked for second offense	1

Inspection of Milch Cows.

The method of milk inspection adopted and enforced by the Department to insure a pure milk-supply to our citizens has been brought, during the past eighteen months, to what is almost a maximum degree of efficiency, as far as adulteration is concerned. The next important step to take was to prevent the sale and use of milk from diseased animals ; and this, of course, could be done only to a limited extent, as the greater part of our milk-supply comes from localities over which this Department has no jurisdiction.

To attempt to determine from the milk alone, as brought into the city, whether the animals producing it were healthy, is impossible, even if a daily examination could be made; the only practical and sure method being to examine the animals themselves. Within our own city limits, however, quite a number of cows (about 3,200) are kept, either to supply milk to the owners, or for sale to the public.

The disease most to be feared, from the fact of its ready transmittance to man, was tuberculosis, and to the detection of this disease, more especially, have the efforts of the Department been directed, for it seems to be generally conceded by those who have made the subject of tuberculosis a study, that the following facts are not to be controverted :

First—That of all diseases that affect mankind tuberculosis is the most prevalent, is the cause of a greater mortality and is on the increase. In our own city the deaths from tuberculosis during the past ten years was 61,155, and it is estimated that of the entire number of deaths from all causes throughout the world 14 per cent. are due to tuberculosis.

Second—Tuberculosis in cattle is exactly the same disease as found in man, and is, of course, propagated and transmitted in a precisely similar manner.

Third—A large proportion of all milch cows are affected with this disease, and while it is difficult to give the absolute percentage of those so diseased, from the fact that the study and investigation of this subject is comparatively recent, still it is universally acknowledged that the prevalence is great.

In our own State, out of 2,147 cows examined, 405 were condemned ; but from certain data obtained by the New York State Commissioners on tuberculosis in cattle, 6.93 per cent. was believed to be about the true percentage of tuberculous cows in New York State.

The report of the Board of Cattle Commissioners of Massachusetts for 1894 gives the following table of the percentage of tuberculous animals from abattoir statistics:

Prussia	8.3	Berlin	12.
Dresden	14.4	Breslau	28.2
Upper Silesia	9.5	Midlothian	20.
Yorkshire	22.8	Durham	18.7
London	25.		

Fourth—Tuberculosis can be transmitted from cattle to man:

(a) Through the milk.

(b) Through the meat.

While of course it is impossible to make the actual experiment upon man to prove the transmission of the disease through the milk or flesh, yet many parallel experiments have been made which show this fact conclusively, particularly when taken in connection with data, showing in certain cases that the source of the disease in these cases was either the milk or flesh of tuberculous animals.

Dr. Brush, in a paper read before the New York State Medical Society in 1895, called attention to this singular confirmation of the transmission through the milk; that is, that in dairy countries the prevalence of tuberculosis was always a settled fact, while in countries not depending upon the ordinary domestic cow as a source of supply for dairy products, the prevalence of the disease was in doubt. One instance he gives, that of Morocco, where there are no European dairy cows, which is exempt from tuberculosis, while in Spain, where the climatic conditions are about the same, tuberculosis is prevalent.

It is safe to say that the concensus of opinion of those who have made this subject a study is that milk from tuberculous animals will propagate the disease in mankind.

To diagnose surely and rapidly this disease in milch cows has until the past few years been almost impossible. Now, however, the discovery and perfection of the so-called "tuberculin test" enables us to do this.

In every case the tuberculin test has been fully confirmed by the autopsy. This is due to the fact that great care and judgment has been exercised. For it is obvious that to err and pronounce a diseased cow as healthy is as bad, if not worse, than to pronounce a healthy cow diseased. In the first a diseased cow remains in the herd to eventually infect the others.

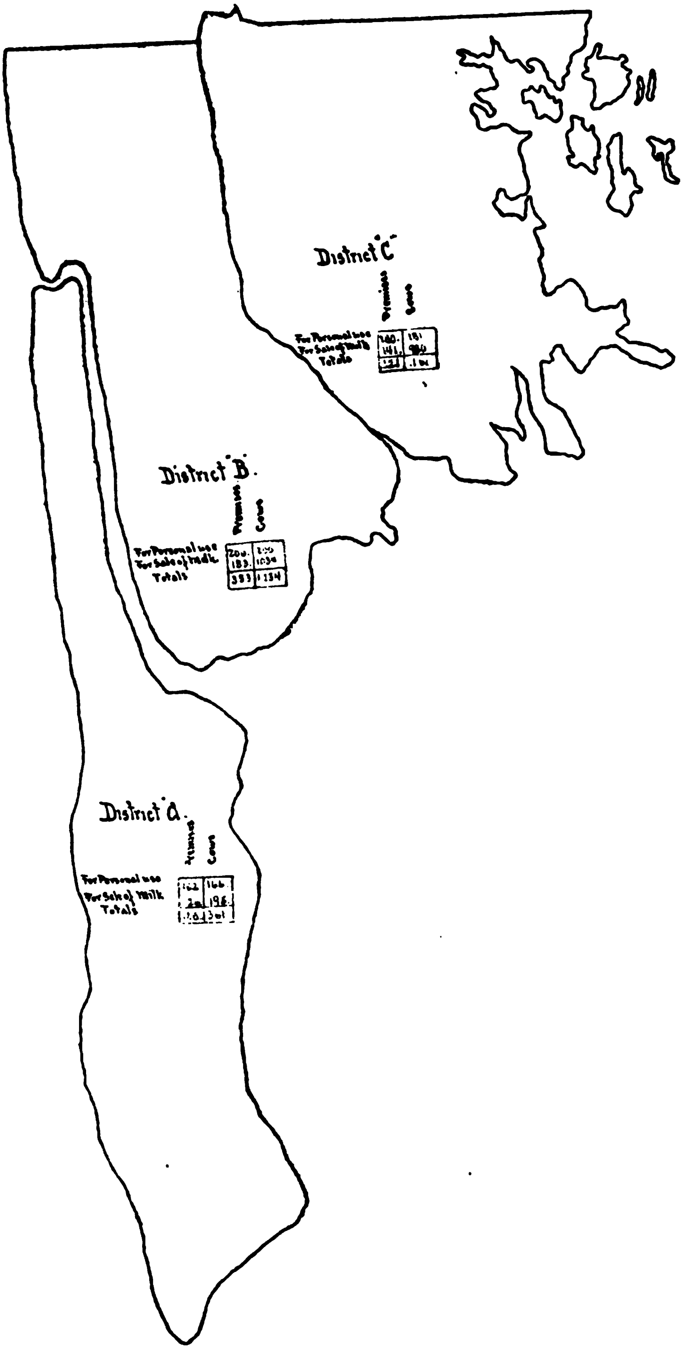
There have been thirty-four cows pronounced healthy by the test, which have subsequently been sold for beef but slaughtered in the presence of the Inspector, and in each case of these thirty-four the autopsies indicated these cows to be free from disease.

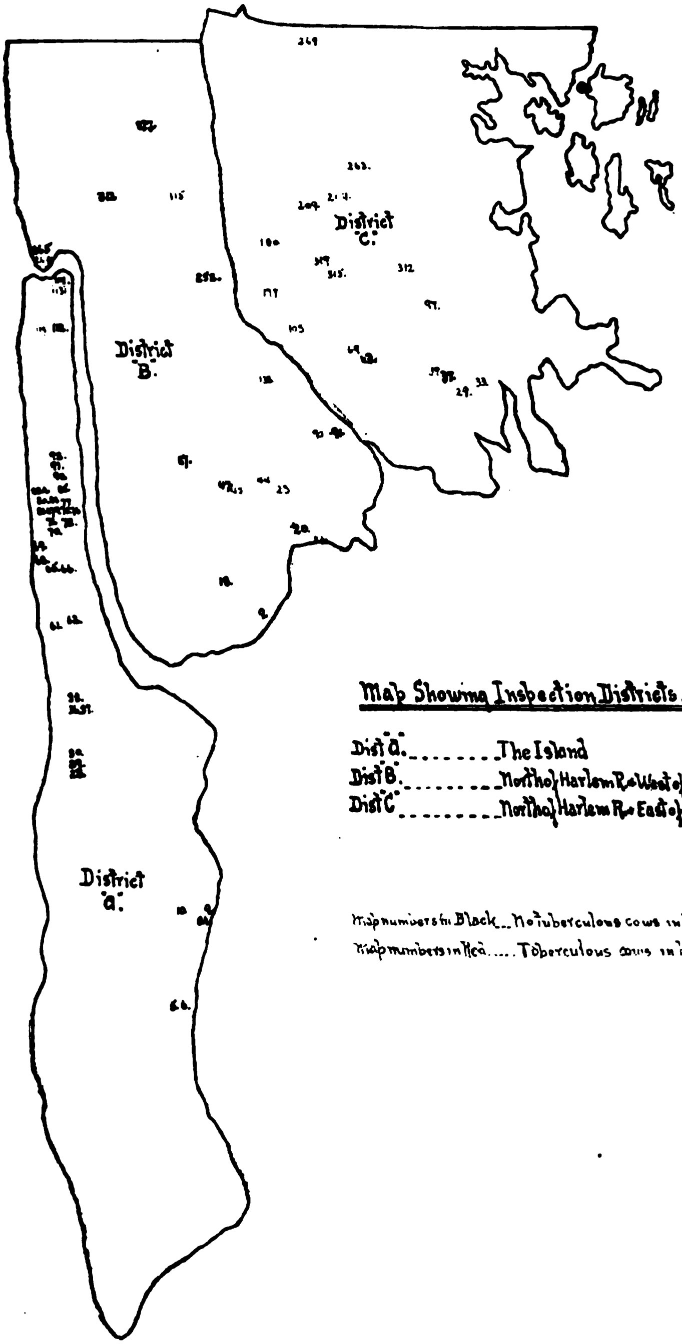
The result of this work has been to prevent the sale of diseased cows in the city, for all that are now sold are not paid for until the cows are examined by the Department; and this fact necessitates the notification of this Department that the cows in question have not been examined, insuring that no cows not examined and perhaps diseased are brought in contact with healthy animals.

As soon as the diseased animals are removed (usually two or three days after the examination), so as to prevent any further infection of the herd, great care is taken in disinfecting the premises where tuberculous cows are found. Usually chloride of lime is used.

The following is the system for the inspection of milch cows and is now being carried on within the limits of the City of New York:

First—A careful census was made and the location of every stable where cows were kept either for producing milk for personal use or for sale. The size of stable, ventilation, care of cows, water supply, care of milk and utensils used, etc., were ascertained, and all of these facts entered in a book for future reference. A number was given to each stable, and this number was entered in its proper place on the following diagram, as is shown:


District "C"
Premises
Cows
For Personal use
For Sale of Milk
Totals
140.
141.
181
District "B".
Premises
Cows
For Personal use
For Sale of Milk
Totals
200.
183.
1034
383
1134
District "A".
Premises
Cows
For Personal use
For Sale of Milk
Totals
166
198



Map Showing Inspection Districts.

Dist a. .... The Island
Dist B. .... North of Harlem R. & West of Bronx.
Dist C .... North of Harlem R. & East of Bronx.

Map numbers in Black -- No tuberculous cows in herd
Map numbers in Red.... Tuberculous cows in herd.

This map indicating only the numbers of places at which the tuberculin test was made.

Second—A sanitary inspection of the premises is first made, with a view to deciding whether the conditions and surroundings are suitable for the care and maintenance of the cows in question. If the water supply is of good quality, more especially if well water is used, in which case a sample is taken and an analysis made to determine this fact. If the handling and care of the milk is satisfactory, if utensils, etc., used in milking are well cared for, and in general if the business is conducted in a sanitary manner.

This having been found satisfactory, the next step is to tag each cow with a tag of the Department. This is fastened in the right ear at a point where it is least liable to be rubbed off by the cow. At the same time the following notice is posted in the stable :

THIS NOTICE MUST BE POSTED IN A CONSPICUOUS PLACE.

HEALTH DEPARTMENT—CITY OF NEW YORK,
CRIMINAL COURT BUILDING, DIVISION OF FOOD INSPECTION,
OFFENSIVE TRADES AND MERCANTILE ESTABLISHMENTS,
NEW YORK..............189..

Rules for the Care of Cows, etc.

Cows must be kept in well-ventilated stables, having at least 600 cubic feet of air space for each cow.

Cows will be tagged with the steel tag of the Health Department. Said tag must not be removed except by an Inspector of this Department.

If it is desired to remove the cow from the stable, the Chief Inspector of Foods and Offensive Trades, etc., at the Health Department, must be notified, and the cow must not be removed until the owner is authorized to do so in writing.

Cows, that have been tagged and examined by this Department must not be kept in stables with other animals or cows not tagged.

Manure must be removed and stable cleaned one hour before milking. The floor and stables must be sprinkled with water just before milking commences.

The teats and bag of cows, and the hands of those engaged in milking, must be washed and well dried before milking commences.

The utensils must be washed with boiling water, containing soda, soap or some alkali, and then with boiling water, before using.

The milk must be strained through a fine sieve, then placed in cooler and cooled to a temperature of at least 50 degrees Fahrenheit before offering for sale.

NOTE.—During cooling, the cooler must be tightly covered with a piece of fine net, to keep out dust.

Care During Examination of Cattle by Officers of this Department.

There must be no change in the care of the cows, or in the amount or quality of food supply, or in the hours of watering, quality and source of water, except by order of the Inspector.

By order of the Board of Health.

CHARLES G. WILSON,
President.

EMMONS CLARK,
Secretary.

Arrangements are then made to commence the tuberculin test the following day. This test is divided into two parts:

1. To determine the normal temperature of the cow.
2. Injection of the tuberculin and noting the subsequent rise of temperature, if any.

The preparation of the tuberculin is carried on by the bacteriologists of this Department, and is made in the usual way, which consists in making as pure a culture as possible, from the bacillus tuberculosis, sterilizing and filtering the same, concentrating, and subsequently determining its comparative strength.

The tuberculin test is applied in detail, as follows:

Tuberculin Test.

The determination of the presence or absence of reaction in any animal from the injection of tuberculin must, of course, be made from a comparison of the body temperature before injection with that after the injection.

For the purpose of making this comparison an accurate one, it is obvious that the temperature taken before injection should be conducted with the same care and attention to details as afterward. With this idea in view, the following rules have been observed as strictly as possible:

Immediately on reaching the stables at 6 A. M., the cows which are tagged with the numbered tag of the Department for the purpose of identification are examined by the Veterinarian for the purpose of excluding from the test any animals having affections, other than possible tuberculosis, which might interfere with the test.

The first temperatures are taken at this same time and are followed by others at three-hour intervals until 6 P. M. At 10 or 11 P. M. the tuberculin is injected, and an interval of nine or ten hours allowed to elapse. At 6 A. M. on the following day the temperature taking is resumed and continued at three-hour intervals as on the first day, until 5 or 8 P. M. or longer.

Care is taken that the temperature before injection and that after injection shall bear the same relation in point of time to the hours of feeding and milking, and the owner is directed to make no change in the daily routine of watering, feeding or milking during the time the cows are under observation.

If accustomed to an out-of-door life, the animals are not continuously housed during the test, but are kept in the open air and near the stables, so that they can be driven in and out for the temperatures every three hours with little excitement or exertion.

If accustomed to be continually housed, of course no change should be made in this respect during the test.

The temperatures are all taken per rectum. This method has some obvious disadvantages, but it also has one greater advantage over the vaginal method in that after the thermometer is once inserted in the rectum, it will generally be retained until the temperature is obtained, and a large number of temperatures can thus be taken at one time by one person. When the vaginal method is used, the thermometer must be continually held, and one person can only take one temperature at one time.

The tuberculin used is that prepared in the Laboratory of this Department. The doses given vary from .25 c.c. to .6 c.c., depending upon the size, age and condition of the animal. For convenience of administration, the strong tuberculin is mixed with distilled water to form a 10 per cent. solution, and the amount of fluid actually injected, therefore, is 2.5 c.c. to 6. c.c.

The subcutaneous connective tissue of both the neck and the shoulder are found to be a little more convenient for the purpose. The syringe used is the ordinary piston-syringe often used for antitoxin injections; the packing is of asbestos, and the whole instrument can be sterilized by boiling without taking apart.

In making positive diagnoses of tuberculosis from the tests, the following points are of importance:

1. The average temperature before injection should be normal or nearly so.

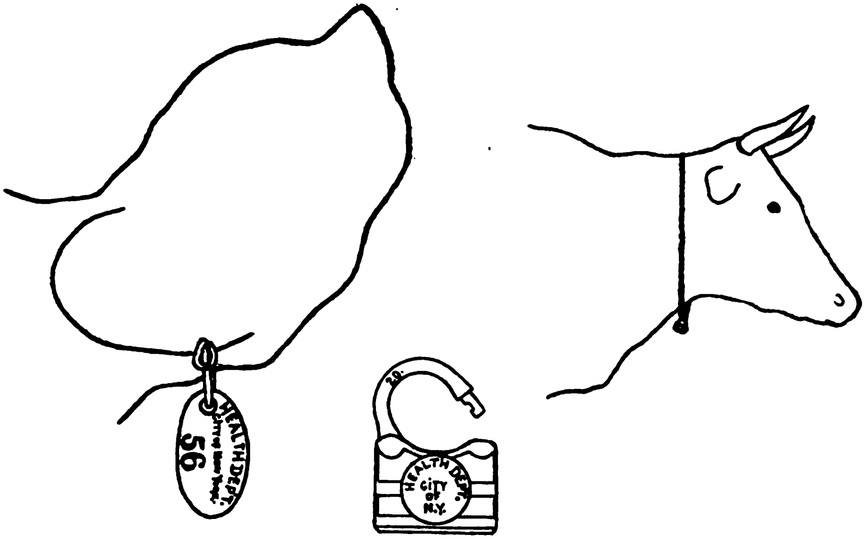
2. As a general rule, with large injections of tuberculin (4 c. c.–6 c. c.) the temperature nine hours after injection should be higher than the maximum temperature before injection, and a maximum "abnormal" temperature should be reached within twelve hours.

3. The difference between the maximum temperature before and the maximum temperature after injection should be, in general, at least 2.5 degrees Fahrenheit.

4. The temperature after injection should remain above the maximum before injection for at least six hours (three consecutive temperature takings).

Of course, no general rules can be laid down which will apply in an unqualified manner to each and every case. To a certain extent every case must be "judged on its own merit."

The healthy cows are then separated from those found to be tuberculous, and a chain made of steel, with welded links, is fastened around the neck of the condemned animal by means of a padlock numbered and marked "Health Department." This lock is sent to the Inspector unlocked. He locks the chain with it, and this chain cannot be removed until the time of killing, as the key is kept at Headquarters and is not at any time in the possession of any one except the Chief Inspector.


HEALTH DEPT.
City of New York
56
20
HEALTH DEPT.
CITY OF N.Y.

These latter are taken to a convenient place and slaughtered, with the consent of the owner, and an autopsy made in each case. The carcass is taken to the Offal Dock or destroyed in offal tank; the killing bed is then washed and disinfected. The stables, etc., are then disinfected, after which healthy cows are allowed to return to the stable.

The success of this tuberculin test is dependent almost entirely upon the care taken to obtain the normal temperature before the injection of the tuberculin. Of course, it is understood that the thermometers used are tested.

Those used by this Department are tested at the Yale College testing stations and guaranteed to be accurate within 2-10 of a degree. Care must also be taken that the tuberculin used is in good condition. Great care is taken not to treat the animals under observation, as far as food, water and surroundings are concerned, except as they have been treated and cared for before the test. In other words, not to make any change that would worry the animals or cause a variation in their normal temperatures.

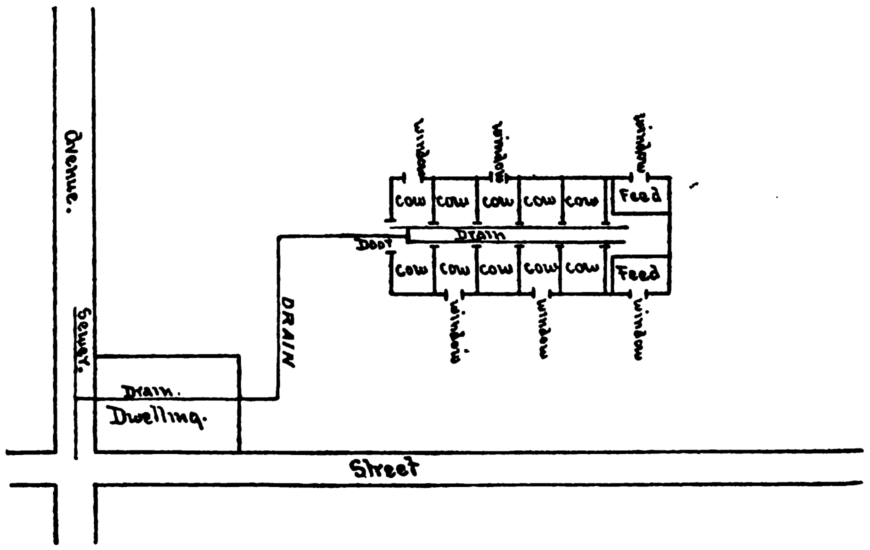
For instance, it is not considered well to make the test upon an animal that has just been moved to her surroundings, but to wait until she has become accustomed to the change of place, water, food, etc.; also to tag the animal the day before the test is commenced, so that the irritation caused by tagging will be over.

Keeping of the Records.

A map is made of the city, in which each stable is located by means of a number, an index being made of numbers on the map for use during the examinations.

When the inspections and reports as to the sanitary condition, tuberculin test, etc., are made, a card index is prepared, giving upon one side of the card the more general results of the sanitary inspection, and upon the other an outline plan of the stable. Also map number, number of permit to keep cows, number of permit to sell milk and when granted (see diagram):

8496 1246	7/30/95 7/30/95	Roe, Richard, 1200 W. 61st st.	Map No. 1000.
No. of Cows. Water. Milk.	10 12760 *a*987	Stable, brick, 23′ x 40′ x 20′. Ventilation, good. No. of cu. ft. of air per Cow, 1,840. Drainage, City Sewer. Manure, Removed daily. Care of Cows, Good. ○ Condition of Cows, Good. Food, Bran, Meal, Hay.	Water for Cows, Croton. Water for Washing, Croton. Disposal of Milk, Sold.



This card is indexed under name.

Another card is prepared giving tag number of each cow, date tagged and date and result of tuberculin test (see diagram below) :

8496 Wagon P. 1246		7/30/95 7/30/95	Roe, Richard, 1200 W. 61st st.	No. of Cows, 10, Map No. 1000.
730	9/4/96	9/5/96	O. K.	
731	9/4/96	9/5/96	O. K.	
732	9/4/96	9/5/96	O. K.	
733	9/4/96	9/5/96	Positive.	
734	9/4/96	9/5/96	O. K.	
735	9/4/96	9/5/96	O. K.	
736	9/4/96	9/5/96	Positive.	○

—and is indexed under location.

The tag number of all cows examined and killed is entered upon cards as follows :

No. 1. A plain card, as in diagram below, where the cow is examined and passed as being healthy.

Tag No.	Date Examined.	Smith, John, 15 Kossuth St.
26	12/12/96	Red cow, white star, dehorned. .... ○ *Inspector.*

No. 2. A card with the upper projection at the left, as in diagram, when the cow has been condemned and slaughtered ; the result of the autopsy being entered upon the reverse, as in diagram below :

Tag No. 25.
5/12/96.

John Doe, 1000 14th ave.
Red Cow.
○ ....
Inspector.

Tag No. 25.

Result of Autopsy.
Liver,
Lungs,
Kidneys,
Mammary Glands,
....
....

○ ....
Inspector.

No. 3. A card with the projection in the middle, where the cow is examined, classed as suspicious and held for examination, as in diagram below :

Reinspect Tag, No. 5.
Tagged 11/12/96.
Richard Roe, 10 Boulder st.
Black Cow, white star, white spot on right shoulder.

○ ....
Inspector.

No. 4. And a card with the projection at the right end, when the cow has been examined, passed as healthy and subsequently killed where we could examine its condition. The entries being the same as in No. 2.

These tag-numbered cards are then kept on file in consecutive numbers, changing them as the results require.

A temperature book is kept in which all of the temperatures in each test are recorded (see example below) :

1896. DATE.	Tag No.	TEMPERATURE (BEFORE).						Average.	Maximum.	Tuberculin Injection site.	Amount, etc., Carb.
		8 a. m.	11 a. m.	2 p. m.	5 p. m.	8 p. m.	11 p. m.				
Aug. 11..	50	103.6	104.9	104.5	105.2	105.2	104.6	104.6+	105.2	Neck R.	30 c. c. E.

1896. DATE.	TEMPERATURE (AFTER).						Average.	Maximum.	Interval between injection and rise of temperature above maximum normal.	Duration of rise.	Amount of rise.	Remarks.	NAME, ETC.
	8 a. m.	11 a. m.	2 p. m.	5 p. m.	8 p. m.	11 p. m.							
Aug. 11...	103.	104.8	104.8	105.3	...	...	104.5—	105.3	Hrs. 19	Hrs.	1°	Negative.	Pat. H. Dunn, 530–42 E. 68th st.

In this way a full and complete record is kept, and one that is easily referred to.

ISSUING OF PERMITS TO KEEP COWS.

A favorable report being made, a permit may be granted by the Board of Health, which reads as follows:

HEALTH DEPARTMENT OF THE CITY OF NEW YORK,
CRIMINAL COURT BUILDING,
NEW YORK, ..., 189..

Permit No.........

.... is hereby authorized to keep cows at premises No.........................under the laws, rules and regulations of the Board of Health of the Health Department of the City and County of New York.

This permit is not transferable to any person or location other than above, and must be kept posted at all times in a conspicuous place in the stable, and is revocable at the pleasure of the Board.

By order of the Board of Health,

CHARLES G. WILSON,
President.

EMMONS CLARK,
Secretary.

Countersigned, EDWARD E. MARTIN,
Chief Inspector Food Division, etc.

On the reverse side is put the tag number and description of cow.

Should the owner decide to increase his herd, the Department is notified.

The cow which is isolated, meanwhile, is examined by the tuberculin test, and if found free from disease, the tag number and description of the cow are entered upon the permit, and permission is given to allow the cow to be stabled with the others.

This is the method now in force and being carried out. The work commenced on July 31, the island part of the city being the first inspected.

A careful preliminary examination showed that in the entire city there were 832 places where cows were kept.

The result of the inspection of diseased cows, while at present it only affects those within the city limits, yet it has very greatly benefited the entire community.

The purchasers in the city of cows will now, before buying, always make a bargain viz.: "I pay, subject to the Health Department test." The dealers, therefore, use their utmost endeavors to only sell healthy animals. In other words, the practical result has been to prevent the sale of unhealthy cows within the city.

Again, letters are received constantly and verbal inquiries are continually being made, to know if a certain milk dealer is selling milk taken from cows inspected by this Department, the inquirer wishing to obtain his supply from some herd that has been examined by us.

The result will be, and is in some cases already, that the dealer, to retain his customers, will be compelled to have his cows examined by some competent authority, we having, of course, no jurisdiction outside of the city; and while it would be much more satisfactory to our citizens and the dealers as well if we had authority to examine all herds supplying New York with milk, yet the examination of cows by competent authority will now follow, as a matter of necessity, for it has assumed the condition where it affects financially the farmer and dealer in milk.

The following table shows the work performed during 1896:

Summary.

	DISTRICT A.	DISTRICT B.	DISTRICT C.	TOTAL.
Number herds examined, tuberculin test	36	18	17	71
" cows examined, " "	213	347	563	1,123
" cows condemned, tuberculin test	31	33	128	192
" cows slaughtered with owners' consent	31	33	128	192
" cows found tuberculous by autopsy	31	33	128	192
" cows not found tuberculous by autopsy	....	....	....	....
" premises disinfected	2	8	15	25
" analyses of water	1	8	25	34

Table Showing Number of Cows Tested, Number of Cows Condemned and Percentage of Tuberculous Cows.

	A.	B.	C.	TOTAL.
Number cows tested, tuberculin test	213	347	563	1,123
" cows condemned, tuberculin test	213	347	563	1,123
Percentage of tuberculous cows	31 14.55	33 9.51	128 22.73	192 17.09

NUMBER OF COWS IN HERDS.

District A.

Herds of	1	2 to 5	5 to 10	10 to 20	30 to 40	43
	63	53	5	5	1	1

		PREMISES.	COWS.
Maximum, 43 cows	For personal use	102	166
Minimun, 1 cow	For sale of milk	26	195
	Total	128	361

Total, 128 herds.

District B.

Herds of	1	2 to 5	5 to 10	10 to 20	20 to 30	30 to 40	47
	196	123	37	17	7	2	1

		PREMISES.	COWS.
Maximum, 47 cows	For personal use	200	200
Minimum, 1 cow	For sale of milk	183	1,034
	Total	383	1,234

Total, 383 herds.

District C.

Herds of	1	2 to 5	5 to 10	10 to 20	20 to 30	30 to 40	40 to 50	125
	177	96	19	15	5	6	2	1

		PREMISES.	COWS.
Maximum, 125 cows	**For personal use**	180	181
Minimum, 1 cow	**For sale of milk**	141	980
	Total	321	1,161

Total, 231 herds.

Grand Total.

Herds of	1	2 to 5	5 to 10	10 to 20	20 to 30	30 to 40	40 to 50	125
	436	272	61	37	12	9	4	1

		PREMISES.	COWS.
Maximum, 125 cows	**For personal use**	482	547
Minimum, 1 cow	**For sale of milk**	350	2,209
	Total	832	2,756

Total, 832 herds.

Date.	Tag No.	Temperatures.						Average.	Maximum.	Tuberculin Injection.	
		Before									
		8 a.m.	11 a.m.	2 p.m.	5 p.m.	8 p.m.	11 p.m.			Site.	Time, Amount, etc.
1896.											
July 30-31.	†1	100.9	100.9	....	101.5 100.6	—101.3	101.4	101.1	101.5	Neck, R.	5% carb., 2.5 c.c., 10% K.........
" 30-31.	2	100.3	100.2	....	102.8 102.6	103.1	101.1	101.7—	103.1	"	"
Aug. 3....	3	101.	101.2	101.2	101.4	101.2	100.6	101.1	101.4	Neck.	"
" 3....	4	100.8	101.2	101.2	101.6	101.1	100.5	101.1—	101.6	"	"
" 3....	5	101.1	101.7	102.4	102.6	101.8	101.8	101.9	102.6	Neck, R.	"
" 3....	6	101.—	100.2	102.—	102.5	103.6	101.9	101.8+	103.6	"	"
" 3....	*7	100.8	101.8	101.6	101.6	102.—	101.5	101.4	102.—	Neck, L.	"
" 3....	8	101.—	100.8	101.3	101.3	101.2	100.8	100.9	101.3	Neck, R.	"
" 3....	9	101.4	100.—	101.—	100.8	101.1	100.9	101.—	101.4	"	"
Sept. 13...	47	101.	101.8	102.1	101.8	101.8	....	101.7	102.1	Neck....	6. c.c ....
" 13...	32	101.5	101.9	100.9	101.3	101.4	....	101.7	101.9	"	5. c.c ....
" 13...	49	101.1	100.6	101.5	100.8	101.2	....	101.	101.5	"	" ....
" 13...	26	101.4	101.7	101.4	102.	100.8	....	101.4	102.	"	" ....
" 13...	20	102.3	102.7	102.6	102.9	103.2	....	102.4	103.2	"	" ....
" 13...	†24	100.8	101.8	101.5	101.1	100.8	....	101.2	101.8	"	" ....
" 13...	36	101.7	101.8	101.7	101.8	102.2	....	101.8	102.2	"	" ....
" 13...	16	101.7	102.6	101.6	102.	101.2	....	101.5	102.1	"	" ....
" 13...	22	100.9	100.6	101.1	102.9	101.	....	101.3	102.9	"	" ....
" 13...	29	101.8	101.9	101.7	101.9	101.4	....	101.7	101.9	"	" ....
" 13...	†33	100.4	100.1	100.8	101.1	101.	....	100.9	101.1	"	" ....
" 13...	212	101.8	101.6	101.3	101.	101.9	....	101.5	101.9	" ...	" ....
" 13...	†34	102.2	103.1	102.8	102.3	102.3	....	102.5+	103.1	"	4. c.c ....
" 13...	31	102.	102.5	101.6	101.7	101.4	....	101.8+	102.5	"	5. c.c ....
" 13...	17	101.6	101.4	101.8	101.7	101.9	....	101.7	101.9	"	" ....
" 13...	19	101.5	101.8	101.9	102.6	101.6	....	101.9	102.6	"	" ....
" 13...	15	102.1	103.	103.3	102.1	100.	....	102.1	103.3	"	" ....
" 13...	14	101.6	101.7	101.5	101.8	101.1	....	101.3+	101.8	"	" ....
" 13...	10	100.7	100.8	100.6	100.6	101.4	....	100.8+	101.4	"	" ....
" 13...	35	102.	100.9	101.9	102.5	101.	....	101.6+	102.5	"	" ....
" 13...	211	101.3	101.6	101.2	100.6	100.8	....	101.5	101.6	"	" ....
" 13...	38	101.1	101.9	102.3	100.9	100.9	....	101.4	102.3	"	4. c.c ....
" 13...	39	101.4	100.9	101.7	101.3	101.2	....	101.3	101.7	"	5. c.c ....
" 13...	46	102.1	102.5	102.6	101.1	101.4	....	101.9+	102.6	"	" ....
" 13...	12	102.4	101.9	101.6	102.2	101.7	....	101.9+	102.4	"	" ....
" 13...	201	102.	101.1	102.2	100.6	101.9	....	101.6—	102.2	"	6. c.c ....
" 13...	25	102.2	102.5	102.9	102.	102.8	....	102.3—	102.9	"	5. c.c ....
" 13...	45	100.7	102.8	102.6	101.7	103.1	....	102.2—	103.1	"	" ....
" 13...	44	101.6	101.6	101.5	100.8	100.1	....	101.4	101.6	"	" ....
" 13...	13	101.	101.7	102.	101.6	100.8	....	101.4+	102.	"	" ....
" 13...	11	101.5	100.6	101.5	101.	101.3	....	101.2—	101.5	"	" ....
" 13...	18	101.9	101.6	100.7	101.9	101.6	....	101.5+	101.9	"	" ....
" 13...	21	101.8	102.6	102.4	102.6	101.7	....	102.2+	102.6	"	" ....
" 13...	23	101.7	101.7	101.8	102.2	101.6	....	101.8	102.2	"	6. c.c ....
" 13...	27	101.	101.2	101.4	101.5	101.6	....	101.3+	101.6	"	5. c.c ....
" 13...	28	102.6	102.	102.	100.6	101.5	....	101.7+	102.6	"	" ....
" 13...	30	102.	102.1	101.3	101.9	101.8	....	101.8+	102.1	"	" ....
" 13...	37	100.9	102.	101.7	101.	100.4	....	101.2	102.	"	" ....
" 13...	40	101.7	102.	101.8	101.7	101.	....	101.6+	102.	"	6. c.c ....
" 13...	41	100.8	101.9	101.6	101.1	101.3	....	101.3+	101.9	"	5. c.c ....
" 13...	42	101.	101.5	100.5	100.4	101.5	....	101.—	101.5	"	" ....
" 13...	43	101.8	101.9	101.7	101.4	102.6	....	101.9—	102.6	"	" ....
" 13...	48	102.3	102.2	102.	102.	101.5	....	102.	102.3	"	" ....
Aug. 11...	50	103.6	104.4	104.5	105.2	105.2	104.6	104.6—	105.2	Neck, R.	Carb., 10.30 p.m., 3. c.c., K.....
" 11...	51	103.	104.	103.8	104.5	103.5	103.2	103.7—	104.5	"	Carb., 10.30 p.m., 3.5 c.c., K.....
" 11...	52	102.9	104.1	103.4	103.7	104.1	104.1	103.7+	104.1	"	"
" 11...	53	101.	101.9	101.2	101.6	102.1	101.2	101.5	102.1	"	Carb., 10.30 p.m., 4. c.c., K.....

TEMPERATURES.				Average.	Maximum.	Interval between injections and rise of temperature above maximum normal.	Duration of Rise.	Amount of Rise.	REMARKS.
AFTER									
2 p.m.	5 p.m.	8 p.m.	11 p.m.						
						Hrs.	Hrs.	Deg.	
105.8	3 p.m. 105.3 5 p.m. 104.6	105.2	9 p.m. 104.6	104.1	105.8	11	10+	4.3	Positive.
101.3	101.6	101.7	99.8	101.0—	10 1.7	..	..	..	Negative.
100.9	101 4	101.5	....	101.+	101.5	21	..	.1	"
101.—	101.8	102.—	....	101.2—	102.—	18	3+	.4	"
103.1	104.4	103.8	102.2	102.8+	104.4	14	6+	1.8	"
101.8	101.2	102.—	....	101.9	103.3	12—	3	..	"
101.8	102.—	102.—	....	101.8	102.9	12+	3	.9	Negative; all parts healthy
101.6	101.2	101.2	....	101.2	102.—	12—	3	.7	Negative.
100.8	101.2	101.5	....	101.—	101.5	10	3	.1	"
102.2	101.8	....	....	101.7+	102.2	16	6—	.1	"
101.6	....	....	....	101.6	101.8	..	..	..	"
101.5	....	....	....	101.5+	101.9	16	3+	.4	"
101.8	....	....	....	101.4+	101.8	..	..	..	"
104.5	104.4	....	....	103.6	104.5	16	6—	1.3	"
103.7	104.2	....	....	103.+	104.2	13	6	2.4	"
102.6	101.8	....	....	102.1	102.6	16	6—	.4	"
101.2	....	....	....	101.5	101.7	..	..	..	"
101.9	....	....	....	101.3	101.9	..	..	..	"
102.1	101.4	....	....	101.6	102.1	16	3+	.2	"
103.3	102.3	....	....	103.4+	104.4	10	9	3.3	"
101.8	....	....	....	101.5	101.8	..	..	..	"
105.2	104.3	....	....	104.4	105.2	10	9	2.1	"
102.	....	....	....	101.8+	102.	..	..	..	"
103.	102.9	....	....	102.6	103.	13	6+	1.1	"
101.4	102.6	....	....	101.7—	102.6	..	..	..	"
103.1	102.6	....	....	102.5+	103.1	..	..	..	"
101.8	101.5	....	....	101.6+	101.8	..	..	..	"
101.2	....	....	....	101.3—	101.4	10	9	.6	"
101.6	....	....	....	101.7	101.9	..	..	..	"
102.2	102.	....	....	102.+	102.2	10	9	.6	"
102.4	102.8	....	....	102.2+	102.8	16	3	.5	"
101.8	101.6	....	....	101.5+	101.8	16	..	.1	"
103.5	103.9	....	....	103.1	103.9	13	6	1.3	"
102.6	102.6	....	....	102.4	102.6	16	3	.2	"
106.3	105.9	....	....	106.1	106.5	10	9	4.3	Condemned; lgs.; mst. and br. gl.; liv.
103.1	102.1	....	....	102.4—	103.1	16	..	.2	Negative.
102.8	102.8	....	....	102.8—	103.	..	..	..	"
101.8	....	....	....	101.5—	101.8	16	..	.2	"
104.	105.4	....	....	103.5+	105.4	13	6	3.4	Condemned; mm. lc. gl.; br. gl.
101.8	....	....	....	101.5—	101.8	16	..	.3	Negative.
102.2	101.6	....	....	101.8—	102.2	16	..	.3	"
105.9	104.	....	....	103.7	105.9	13	6	3.3	Condemned; lgs.; mes. gl.
101.8	....	....	....	101.4—	101.8	..	..	..	Negative.
103.2	103.	....	....	102.5—	103.2	13	6—	1.6	"
101.5	....	....	....	101.3+	101.5	..	..	..	"
102.1	....	....	....	102.	102.1	..	..	..	"
103.	....	....	....	102.+	103.	13	6+	1.0	"
102.4	101.8	....	....	102.+	102.4	16	6—	.4	"
102.	....	....	....	101.9	102.	13	3	.1	"
101.3	....	....	....	101.	101.3	..	..	..	"
102.7	102.8	....	....	102.2—	102.8	16	3	.2	"
102.1	....	....	....	101.5—	102.1	..	..	..	"
104.8	105.3	....	....	104.5—	105.3	19	3+	.1	"
104.2	104.7	....	....	104.1—	104.7	19	3+	.2	"
103.9	104.7	....	....	103.7—	104.7	19	3+	.6	"
102.1	101.8	....	....	102.—	102.7	11	3+	.6	"

DATE.	TAG No.	TEMPERATURES.						Average.	Maximum.	TUBERCULIN INJECTION.	
		BEFORE									
		8 a. m.	11 a. m.	2 p. m.	5 p. m.	8 p. m.	11 p. m.			Site.	Time, Amount, etc.
1896. Aug. 11...	*54	102.2	102.9	104.3	104.6	104.6	104.6	103.9+	104.6	Neck, R.	Carb., 10 p. m., 3.5 c. c., K....
" 11...	55	103.	105.1	105.1	105.6	106.	105.6	105.1+	106.	"	"
" 11...	56	101.1	101.5	101.2	102.1	102.—	101.6	101.4	102.1	"	Carb., 11 p. m., 4. c. c., R....
" 11...	57	102.5	103.4	104.1	104.9	105.—	105.6	104.3	105.6	"	"
" 11...	58	101.—	102.3	103.—	103.—	104.—	105.—	103.+	105.—	"	"
" 18...	59	101.3	101.—	101.3	101.9	103.—	....	101.7—	103.0	"	10% carb. ....
" 18...	60	101.8	100.9	101.8	101.5	101.6	101.7	101.5+	101.8	"	3. c. c., K..........
" 18...	61	101.8	100.9	101.7	102.1	101.1	101.9	101.7+	102.1	"	3.5 c. c., K..........
" 18...	62	100.8	100.7	101.3	102.—	102.—	99.8	101.—	102.—	Neck, L.	4. c. c., K..........
" 18...	63	101.9	101.8	102.7	102.2	100.9	....	101.9—	102.7	"	10% carb., 2.5 c. c., K.
" 18...	64	101.4	100.7	101.2	101.8	101.5	....	101.4—	101.8	"	10% carb., 4. c. c., K.
" 18...	65	100.9	100.8	101.8	101.3	101.2	....	101.2	101.8	"	"
" 18...	66	101.3	101.2	102.4	101.2	102.2	....	101.7—	102.4	"	"
" 18...	67	101.4	100.9	100.8	101.	100.8	....	101.—	101.4	"	"
" 18...	68	101.8	100.9	102.2	102.2	101.3	....	101.7—	102.2	"	"
" 18...	69	100.3	101.	101.8	101.6	102.1	....	101.4—	102.1	"	"
" 18...	70	100.8	101.	100.8	101.2	102.1	....	101.2—	102.1	"	"
" 18...	71	101.1	101.2	101.2	101.4	101.	....	101.2—	101.4	"	"
" 18...	72	101.8	101.8	101.2	101.9	101.9	....	101.7+	101.9	"	"
" 18...	73	101.	100.8	101.6	101.2	101.9	....	101.3	101.9	"	"
" 18...	74	101.5	102.2	102.8	101.8	102.4	....	102.1+	102.8	"	"
" 18...	75	100.6	101.8	101.8	101.8	101.4	....	101.5	101.8	"	"
" 18...	76	100.6	101.1	100.7	100.8	100.9	....	100.8	101.1	"	"
" 18...	77	101.2	100.9	101.8	102.3	101.1	....	101.5—	102.3	"	10% carb., 3. c. c., K.
" 18...	78	102.9	101.7	101.8	101.9	101.7	....	102.	102.9	"	10% carb., 3.5 c. c., K.
" 18...	79	101.3	101.2	101.2	101.8	100.9	....	101.3—	101.8	"	10% carb., 4. c. c., K.
" 18...	80	101.	100.9	100.9	101.8	100.6	....	101.	101.8	"	"
" 18...	81	101.5	101.2	101.6	101.3	101.2	....	101.4—	101.6	"	"
" 18...	82	101.9	101.5	101.5	101.6	100.6	....	101.4+	101.9	"	"
" 18...	83	102.4	101.5	101.8	102.1	101.2	....	101.8	102.4	"	10% carb., 3. c. c., K.
" 18...	84	102.6	101.6	101.5	102.8	102.3	....	102.2—	102.8	"	10% carb., 4. c. c., K.
" 18...	85	102.3	101.9	101.5	101.6	102.2	....	101.9	102.3	"	"
" 18...	86	101.8	101.6	102.5	102.3	101.6	....	101.9+	102.5	"	"
" 18...	87	102.2	101.2	101.7	101.8	101.8	....	101.7+	102.2	"	"
" 18...	88	101.	100.8	101.9	101.3	101.8	....	101.4—	101.9	"	"
" 18...	89	100.5	100.7	101.5	101.7	101.6	....	102.2	101.7	"	"
" 18...	90	102.4	101.2	101.6	101.9	101.4	....	101.7	102.4	"	"
" 18...	*91	100.2	101.5	101.6	101.8	101.6	....	101.7+	102.2	"	" ....
" 18...	92	101.5	101.6	101.5	101.8	101.8	....	101.6+	101.8	"	" ....
" 18...	*93	101.9	101.3	101.5	100.7	101.6	....	101.4	101.9	"	" ....
" 18...	94	102.1	101.8	102.	102.2	101.8	....	102.—	102.2	"	" ....
" 18...	95	102.4	101.6	101.7	102.2	102.4	....	101.9+	102.4	"	" ....
" 18...	*96	102.3	101.1	101.5	101.5	101.2	....	101.5+	102.3	"	" ....
" 18...	97	102.2	101.6	101.7	101.8	102.0	....	101.9	102.3	"	" ....
" 18...	*98	101.2	100.2	101.3	101.3	101.0	....	101.0	101.3	"	" ....
" 18...	*99	100.4	100.7	101.4	101.8	101.2	....	101.0	101.8	"	" ....
" 20...	*100	100.2	103.	102.—	101.7	100.6	....	101.5	103.—	Neck....	Carb., 3 c. c., K..
" 20...	*101	100.8	102.4	101.5	101.3	100.3	....	101.3	102.4	"	" ..
" 20...	*102	100.2	101.7	101.—	101.3	100.8	....	101.—	101.7	"	" ..
" 20...	103	101.	101.5	101.8	101.5	101.	....	101.4—	101.8	"	" ..
" 20...	104	101.9	101.	101.4	101.9	101.3	....	101.3	101.9	"	" ..
" 20...	*105	....	100.9	102.2	102.3	100.8	100.9	101.4+	102.3	Neck, R.	" ..
" 20...	106	....	101.4	102.	102.3	101.8	101.5	101.8	102.3	Neck....	" ..

TEMPERATURES.										
AFTER										
1 m.	2 p.m.	5 p.m.	8 p.m.	11 p.m.	Average.	Maximum.	Interval between injections and rise of temperature above maximum normal.	Duration of Rise.	Amount of Rise.	REMARKS.
							Hrs.	Hrs.	Deg.	
.1	103.1	104.2	....	....	102.8+	104.2	..	..	..	Negative; all parts healthy
.8	105.9	105.7	....	....	104.7+	105.9	..	..	..	Negative.
.2	101.2	101.5	....	....	101.2	101.5	..	..	..	"
.1	104.1	103.4	....	....	103.3—	104.1	..	..	..	"
.2	102.1	102.—	....	....	102.+	102.2	..	..	..	"
..	....	....	....	....	....	....	..	..	..	Not tested; delivered of bull calf at 7.30 a.m.
.8	101.8	101.7	....	....	101.8—	101.8	..	..	..	Negative.
.7	101.6	101.9	....	....	101.7	101.9	..	..	..	"
.4	101.2	102.—	....	....	101.5	102.—	..	..	..	"
.5	102.	102.2	....	....	101.7+	102.2	..	..	..	"
.5	105.7	104.	....	....	105.5+	106.5	9—	9+	4.7	Condemned; lgs.; mst. gl.; liv.; kid.; mm. gl.
.9	104.6	103.5	....	....	104.9	105.9	9—	9+	4.1	Condemned; bn.; lgs.; mst. gl.; mm. gl.
.5	102.7	102.5	....	....	102.1	102.7	15	3	.3	Negative.
.6	105.5	105.6	....	....	105.3+	105.6	9—	9+	4.2	Condemned; lgs.; mst. gl.
.1	105.2	104.3	....	....	105.1	106.1	9—	9+	3.9	Condemned; mst. gl.
.2	101.5	101.4	....	....	101.5	101.9	..	..	..	Negative.
.2	104.1	104.7	....	....	105.2+	106.2	9—	9+	4.1	Condemned; lgs.; mst. gl.
.2	105.6	105.	....	....	103.9	105.6	9—	9+	4.2	" "
.1	103.9	102.6	....	....	103.6+	105.1	9—	9+	3.2	Condemned; mst. gl.; liv.
.5	[illegible]	105.8	....	....	106.3	106.7	9—	9+	4.8	Condemned; lgs.; mst. gl.; mm. gl.
	106.5	105.7	....	....	105.2	106.5	9—	9+	3.7	Condemned; mst. gl.; mes. gl.; mm. gl.
.8	105.4	105.5	....	....	105.8—	106.4	9—	9+	4.6	Condemned; bn.; lgs.; mst. gl.; mes. gl.
.6	106.3	104.5	....	....	105.2+	106.3	9—	9+	5.2	Condemned; lgs.; mst. gl.
.6	106.9	170.	....	....	106.9+	107.3	9—	9+	5.0	Condemned; bn.; mst. gl.; mes. gl.; liv.; spl.
.2	104.8	103.3	....	....	105.3	106.9	9—	9+	4.0	Condemned; mst. gl.
.5	106.5	105.9	....	....	105.9+	106.5	9—	9+	4.7	Condemned; mst. gl.; mm. gl.
.1	107.1	107.4	....	....	107.2	107.4	9—	9+	[illegible].6	Condemned; mst. gl.
.9	106.	104.4	....	....	105.4+	106.	9—	9+	4.4	Condemned; lgs.; mst. gl.
.6	105.5	105.7	....	....	105.5	105.7	9—	9+	3.8	" "
.8	105.4	104.3	....	....	105.4—	106.	9—	9+	3.6	Condemned; mst. gl.
.8	104.5	103.7	....	....	103.3	104.5	12	6+	1.7	Negative.
.	106.6	106.	....	....	105.9+	107.	9—	9+	4.7	Condemned; lgs.; mst. gl.
.2	105.1	104.8	....	....	104.5—	105.1	9—	9+	2.6	Condemned; lgs.; pl.; mst. gl.; mes. gl.; liv.; mm. gl.
.4	106.	106.5	....	....	105.9+	106.5	9—	9+	4.3	Condemned; bn.; mst. gl.; mes. gl.; mm. gl.
.8	106.2	105.4	....	....	105.6—	106.2	9—	9+	4.3	Condemned; lgs.; mst. gl.
.5	104.8	104.9	....	...	104.7+	105.5	9—	9+	3.8	Condemned; lgs.; pl.; mst. gl.; mes. gl.; liv.; mm. gl.
.	106.2	107.4	....	....	106.8+	107.8	9—	9+	5.4	Condemned; lgs.; mst. gl.; mm. gl.
.4	101.9	102.	....	....	101.8	102.	..	..	..	Negative; all parts healthy.
.6	105.6	106.	....	....	105.3	106.	9	9+	4.2	Condemned; lgs.; mst. gl.
.3	102.2	101.9	....	....	101.8	102.2	15	3	.3	Negative; all parts healthy.
.2	105.5	105.7	....	....	105.8+	107.2	9	9+	5.0	Condemned; lgs.; mst. gl.
.2	103.9	105.9	....	....	105.5+	106.2	9	9+	3.8	Condemned; bn.; mst. gl.
.8	105.1	104.	....	....	103.5+	105.1	12	9+	2.8	Negative; all parts healthy.
.7	102.6	101.9	....	....	102.	102.6	15	3+	.4	Negative.
.8	105.4	104.2	....	....	103.4+	105.4	9—	9+	.4	Negative; all parts healthy.
.9	104.9	105.5	....	....	105.4+	105.9	9—	9	4.1	Condemned; lgs.; mst. gl.
.6	104.2	103.3	....	....	103.5	104.2	15	3+	1.2	Negative; all parts healthy.
.—	103.4	101.6	....	....	101.6+	102.4	..	..	..	" "
.2	101.7	101.2	....	....	101.6—	102.2	9	3+	.5	" "
.5	101.7	101.5	....	....	101.5	101.7	..	..	..	Negative.
.6	102.4	101.8	....	....	101.8+	102.4	15	..	.5	"
.1	103.4	102.3	....	....	102.4—	103.4	15	3	1.1	"
.5	101.1	101.8	....	....	101.5+	101.8	..	..	..	Negative; all parts healthy.

Date.	Tag No.	Temperatures.								Tuberculin Injection.	
		Before									
		8 a.m.	11 a.m.	2 p.m.	5 p.m.	8 p.m.	11 p.m.	Average.	Maximum.	Site.	Time, Amount, et
1896.											
Aug. 20...	107	....	101.6	102.3	102.3	100.9	101.2	101.7—	102.3	Shoul., L.	Carb., 3 c. c.,
" 20...	108	....	101.5	100.	102.2	101.3	101.8	101.4—	102.2	Neck....	"
" 20...	*109	....	101.3	101.5	102.6	101.	101.1	101.5	102.6	"	"
" 20...	*110	....	101.8	102.5	103.	101.8	101.9	102.2	103.	"	"
" 20...	*111	....	101.2	101.6	101.8	101.9	101.1	101.5+	101.9	"	"
" 20...	112	....	101.—	102.6	101.4	100.5	100.	101.1	102.6	"	"
" 20...	113	....	100.9	101.4	101.5	100.	99.9	100.7+	101.5	"	Carb., 4 c. c.,
" 20...	*114	....	101.5	101.7	101.2	101.3	100.5	101.2+	101.7	"	"
" 20...	115	....	101.9	102.5	103.2	102.	101.3	102.2—	103.2	"	Carb., 3 c. c.,
" 20...	*116	....	101.4	102.	102.6	101.5	101.2	101.7+	102.6	"	"
" 20...	*117	....	101.3	101.8	102.8	101.3	100.7	101.6—	102.8	"	Carb., 4 c. c.,
" 20...	*118	....	101.5	101.5	100.5	101.7	101.6	101.6—	101.7	Neck, R.	Carb., 3 c. c.,
" 20...	*119	....	101.5	101.4	101.6	101.	101.	101.3	101.6	Neck, L.	Carb., 4 c. c.,
" 20...	120	....	101.5	102.7	102.8	101.4	100.9	101.9—	102.8	"	Carb., 5 c. c.,
" 25...	121	102.2	....	101.5	101.8	101.6	101.3	101.7—	102.2	"	Carb., 4 c. c.,
" 25...	122	102.	....	100.9	101.4	102.3	102.	101.7+	102.3	"	"
" 25...	123	101.4	....	100.7	101.6	101.8	101.2	101.3+	101.8	"	"
" 25...	124	102.4	....	101.8	101.8	102.6	102.3	102.2—	102.6	"	"
" 25...	125	101.5	....	101.9	101.8	101.9	101.	101.6+	101.9	"	"
" 25...	*126	100.9	....	100.6	101.8	101.2	100.4	101.—	101.8	"	"
" 25...	127	103.4	....	102.1	102.8	102.6	102.4	102.6+	103.4	"	Carb., 3 c. c.,
" 25...	*128	102.	....	101.2	100.8	101.	101.1	101.2+	102.	"	Carb., 4 c. c.,
" 25...	129	102.5	....	101.6	101.7	101.	101.9	101.9+	102.5	"	"
" 25...	130	101.3	....	101.6	100.5	100.8	100.	100.8+	101.6	"	"
" 25...	131	102.3	....	101.3	101.3	101.6	101.5	101.6	102.3	"	"
" 25...	132	101.7	....	101.6	101.6	101.6	101.4	101.6—	101.7	"	"
" 25...	133	101.4	....	100.6	102.2	101.2	101.	101.3—	102.2	"	"
" 25...	134	103.3	....	104.9	103.4	103.2	102.6	103.5—	104.9	"	Carb., 5 c. c.,
" 28...	135	99.5	101.8	102.4	103.4	101.1	....	101.6+	103.4	"	Carb., 4 c. c., K
" 28...	136	100.3	101.4	101.7	102.6	102.1	....	101.6+	102.6	"	"
" 28...	137	100.1	101.	101.7	101.6	101.5	....	101.2	101.7	"	Carb., 5 c. c., K
" 28...	138	100.1	101.3	101.8	102.2	101.5	....	101.4—	102.2	"	"
" 28...	139	99.6	101.	101.6	102.2	101.9	....	101.3—	102.2	"	"
" 28...	140	100.9	101.4	102.	102.7	101.6	....	101.7+	102.7	"	"
" 28...	141	99.4	101.	101.7	102.	100.6	....	100.9+	102.	"	"
" 28...	142	102.5	103.9	101.9	101.8	101.2	....	102.3—	103.9	"	"
" 28...	143	101.	101.4	102.1	102.8	101.1	....	101.5—	102.8	"	"
" 28...	144	100.8	101.9	102.4	103.	102.1	....	102.+	103.	"	Carb., 4 c. c., K
" 28...	145	100.5	101.4	101.9	102.7	101.4	....	101.6—	102.7	"	Carb., 5 c. c., K
" 28...	146	101.4	101.8	102.3	103.1	102.4	....	102.2	103.1	"	Carb., 25 c. c.,
" 28...	147	101.9	101.7	102.4	102.2	101.9	....	102.+	102.4	"	"
Sept. 3...	148	101.5	101.6	102.3	101.3	100.7	....	101.5—	102.3	Neck....	Carb., 5 c. c....
" 3...	*149	101.9	101.5	101.8	102.	101.4	....	101.7+	102.	"	" ....
" 3...	*150	102.3	102.9	102.9	102.9	102.3	....	102.6+	102.9	"	" ....
" 3...	*151	100.9	101.2	101.8	101.2	100.9	....	101.2	101.8	"	" ....
" 3...	152	102.1	102.6	103.4	103.	101.6	....	102.5+	103.4	"	" ....
" 3...	153	101.9	101.6	101.2	101.3	101.9	....	101.6—	101.9	"	" ....
" 8...	*154	102.2	101.4	100.4	101.3	101.	....	101.3—	101.4	"	Carb., 5 c. c.,
" 8...	155	100.7	100.6	101.6	101.9	101.	....	101.2—	101.9	"	"
" 8...	156	100.2	100.7	101.5	102.3	101.8	....	101.3	102.3	"	"
" 8...	†157	103.1	103.7	102.9	103.7	103.5	....	103.4—	103.7	"	"
" 8...	158	100.8	101.6	101.9	101.8	101.	....	101.4+	101.9	"	"
" 8...	*159	100.4	101.5	101.3	101.3	101.1	....	101.1+	101.5	"	"
" 8...	160	101.1	101.4	101.	102.5	101.5	....	101.5	102.5	"	"
" 8...	161	101.2	101.1	101.2	101.5	100.8	....	101.2	101.5	"	"
" 8...	162	100.2	101.	101.9	101.9	100.8	....	101.2	101.9	"	"
" 8...	163	100.7	100.7	101.5	101.8	100.9	....	101.1+	101.8	"	Carb., 10 p m.,
" 8...	164	100.6	101.	101.3	101.3	100.7	....	101.—	101.3	"	"
" 13...	165	....	101.	100.6	100.7	100.9	....	100.8	101.	"	"
" 13...	166	....	102.4	102.6	102.9	101.7	....	102.3	102.9	"	"
" 13...	167	....	101.5	101.9	101.8	102.	....	101.8	102.	"	"
" 13...	168	....	102.8	101.7	103.	102.2	....	102.4	103.	"	"
" 13...	166	....	102.5	101.9	102.1	101.2	....	101.9	102.5	"	"
" 13...	170	....	103.2	102.9	102.7	102.2	....	102.8	103.2	"	"
" 13...	171	....	100.2	100.1	100.7	100.4	....	100.3	100.7	"	"
" 13...	*172	....	101.5	101.	101.8	100.2	....	101.1	101.8	"	"

TEMPERATURES.					Average.	Maximum,	Interval between injections and rise of temperature above maximum normal.	Duration of Rise.	Amount of Rise.	REMARKS.
AFTER										
1 m.	2 p.m.	5 p.m.	8 p.m.	11 p.m.			Hrs.	Hrs.	Deg.	
.7	102.3	102.4	....	....	102.+	102.4	18	3	.1	Negative.
.2	101.5	101.7	....	....	101.3—	101.7	..	..	..	"
.6	102.	101.9	....	...	101.6+	102.	..	..	..	Negative; all parts healthy.
.4	103.6	103.	....	....	102.4+	103.6	15	3	.6	" "
.2	101.5	101.5	....	....	101.5	101.8	..	..	..	" "
.6	101.5	101.4	....	....	101.1	101.5	..	..	..	Negative.
.5	100.3	101.5	....	....	100.7	101.5	..	..	..	"
.4	101.4	101.3	....	....	101.4—	101.4	..	..	..	Negative; all parts healthy.
.6	103.2	102.6	....	....	102.3+	103.2	..	..	..	Negative.
.7	102.2	101.8	....	....	101.8—	102.2	..	..	..	Negative; all parts healthy.
.8	105.5	103.8	....	....	103.	105.5	15	3+	2.7	" "
.8	101.4	101.7	....	....	101.5+	101.8	12	3+	.1	" "
.6	101.3	101.4	....	....	101.3+	101.6	..	..	..	" "
.6	102.3	101.9	....	....	101.8+	102.3	..	..	..	Negative.
.9	101.5	101.	....	....	101.6	103.	9	..	.8	"
.6	102.3	102.	....	....	101.6+	102.3	..	..	..	"
.1	101.6	100.8	....	....	101.5	102.1	12	..	.3	"
.4	102.4	101.2	....	....	101.8+	102.4	15	3+	..	"
.2	102.7	102.1	....	....	102.2	102.7	12	6+	.8	"
.1	101.3	101.2	....	....	101.3	101.6	..	..	..	Negative; all parts healthy.
.7	104.	104.	....	....	102.9+	104.	15	6+	.6	Negative.
.6	101.6	102.3	....	....	102.1—	102.6	12	3+	.6	Negative; all parts healthy.
.7	102.	102.2	....	....	101.8+	102.2	..	..	..	" "
.7	101.9	101.6	....	....	101.7	101.9	15	3+	.3	" "
.6	102.	101.5	....	....	101.7+	102.	..	..	..	" "
.4	102.7	101.9	....	....	109.9+	102.7	15	3+	1.0	" "
1.	101.2	101.	....	....	101.+	101.2	..	..	..	" "
2.	103.5	102.8	....	....	102.5	103.5	..	..	..	" "
.2	101.2	102.	....	....	101.7+	102.	..	..	..	"
.2	101.7	103.	....	....	101.7+	102.2	..	..	..	"
.5	101.1	101.7	....	....	101.2	101.7	..	..	..	"
.4	101.	101.3	....	....	101.1+	101.4	..	..	..	"
.3	101.4	101.8	....	....	101.4	101.8	..	..	..	"
1.6	101.4	101.5	....	....	101.4—	101.6	..	..	..	"
1.4	101.2	101.1	....	....	100.9+	101.4	..	..	..	"
.8	101.1	101.1	....	....	100.8+	101.1	..	..	..	"
1.3	101.	102.1	....	....	101.5+	102.1	..	..	..	"
1.3	102.4	103.2	....	....	102.+	103.2	19	3+	.2	"
1.4	101.1	101.8	....	....	101.3+	101.8	..	..	..	"
2.1	101.4	102.9	....	....	102.1—	102.9	..	..	..	"
1.6	101.3	102.1	....	....	101.5+	102.1	..	..	..	"
1.	101.4	....	....	....	101.2	101.4	..	..	..	"
1.9	103.2	....	....	....	102.+	103.2	16	3+	1.2	Negative; healthy.
1.4	101.7	....	....	....	101.4+	101.7	..	..	..	"
1.2	101.	....	....	....	100.7	101.2	..	..	..	"
1.9	102.1	....	....	....	102.	102.1	..	..	..	Negative.
1.3	102.	....	....	....	101.3	102.	16	3+	.1	"
1.	102.1	....	....	....	101.4	102.1	16	3+	.7	Negative; healthy.
0.9	101.8	....	....	....	101.2	101.8	..	..	..	Negative.
1.4	101.7	....	....	....	101.6	101.7	..	..	..	"
3.7	104.4	105.2	....	....	104.	105.2	13	9+	1.5	Doubtful; this cow should be re-tested.
1.8	102.4	102.2	....	....	101.9	102.4	16—	6+	.5	Negative.
0.9	101.4	....	....	....	101.1+	101.4	..	..	..	Negative; healthy.
1.4	102.2	....	....	....	101.6+	102.2	..	..	..	Negative.
1.1	101.8	....	....	....	101.5—	101.8	10	3+	.3	"
1.7	101.6	....	....	....	101.8+	102.2	10	..	.3	"
0.8	101.5	....	....	....	100.9+	101.5	..	..	..	"
1.	101.4	....	....	....	100.8+	101.4	16	3+	.1	"
0.8	101.4	....	....	....	100.9	101.4	16	3+	.4	"
0.7	101.5	....	....	....	100.6	101.5	..	..	..	"
0.1	101.6	....	....	....	101.2	101.6	..	..	..	"
2.4	102.5	....	....	....	102.3	102.5	..	..	..	"
2.1	101.1	....	....	....	101.4	102.1	..	..	..	"
3.	103.3	...	....	....	102.6	103.3	16	3+	.1	"
0.6	101.	....	....	....	100.3	101.	16	3+	.3	"
01.2	101.7	....	....	....	101.2	101.7	..	..	..	Negative; healthy.

Date.	Tag No.	Temperatures.								Tuberculin Injection.	
		Before						Average.	Maximum.		
		8 a. m.	11 a. m.	2 p. m.	5 p. m.	8 p. m.	11 p. m.			Site.	Time, Amount, etc.
1896. Sept. 13...	173	....	102.1	101.2	100.9	100.8	....	101.2	102.1	Neck....	Carb., 10 p. m., 5 c.c.
" 13...	173	....	101.5	100.2	101.3	102.1	....	101.3	102.1	"	"
" 13...	175	....	100.	100.	99.7	101.3	....	100.2	101.3	"	"
" 19...	176	101.2	101.1	101.5	101.4	101.4	....	101.3+	101.5	"	4 c. c., K..........
" 19...	177	101.1	102.2	102.9	103.3	100.	....	101.9	103.3	"	3 c. c., K..........
" 19...	178	100.4	101.	101.5	101.1	101.6	....	101.1+	101.6	"	" ....
" 19...	179	101.9	101.7	101.5	102.5	101.	....	101.7+	102.5	" ...	" ....
" 19...	180	100.9	101.4	102.2	102.3	101.1	....	101.6—	102.3	" ...	" ....
" 19...	181	101.3	102.1	103.1	102.5	101.7	....	102.1+	103.1	"	4 c. c., K..........
" 19...	182	100.8	101.	101.4	101.5	101.9	....	101.3+	101.9	"	" ....
" 19...	*183	101.1	101.	101.8	101.3	99.8	....	101.	101.8	"	" ....
" 19...	184	101.2	101.7	102.	101.9	101.6	....	101.6+	102.	"	5 c. c., K..........
" 19...	185	101.8	101.	101.	101.5	....	....	101.1—	101.5	"	3 c. c., K..........
" 19...	186	101.2	100.8	101.4	101.7	....	....	101.3—	101.7	"	" ....
" 19...	187	101.2	100.9	104.2	103.5	....	....	102.5	104.2	"	" ....
" 19...	188	101.	100.9	104.2	103.5	....	....	102.4—	104.2	"	" ....
" 19...	189	100.8	100.9	102.8	102.8	....	....	101.8+	102.8	"	" ....
" 19...	190	100.9	101.	102.3	102.9	....	....	102.4—	102.9	"	4 c. c., K..........
" 19...	191	101.8	102.	103.6	103.	....	....	102.6	103.6	"	" ....
" 19...	†192	101.5	101.4	102.6	102.7	....	....	102.+	102.7	"	25 c. c., K..........
" 19...	193	101.5	101.5	101.9	102.	....	....	101.7+	102.	"	4 c. c., K..........
" 22...	194	101.3	101.5	100.8	101.2	100.6	....	101.+	101.5	"	" ....
" 22...	195	101.2	101.6	101.2	101.8	100.6	....	101.2+	101.8	"	" ....
" 22...	196	100.	100.7	100.5	101.6	100.1	....	100.6—	101.6	"	" ....
" 22...	197	101.2	101.5	101.4	101.7	101.2	....	101.4+	101.7	"	" ....
" 22...	198	101.4	101.4	101.5	101.5	101.6	....	101.5—	101.6	"	" ....
" 22...	199	101.7	101.6	102.4	102.5	103.1	....	102.2+	103.1	"	" ....
" 22...	200	100.8	101.7	101.7	101.8	101.2	....	101.4+	101.8	"	" ....
" 22...	213	101.1	101.9	101.7	101.9	101.5	....	101.6+	101.9	"	" ....
" 24-26.	202	101.2	101.9	102.6	101.8	101.5	....	101.8	102.6	Neck, L.	5 c. c., K..........
" 24-26.	203	100.8	101.	101.7	101.8	101.1	....	101.2+	101.8	"	3 c. c., K..........
" 24-25.	204	100.6	100.9	101.3	101.8	101.3	....	101.2—	101.8	Neck, R.	4 c.c., K..........
" 24-25	205	101.5	102.3	102.	101.9	101.4	....	101.8+	102.3	Neck, L.	3 c. c., K..........
" 24-25.	206	101.1	102.2	102.2	101.9	101.7	....	101.8+	102.2	Neck, R.	5 c. c., K..........
" 24-25.	207	101.5	101.2	101.6	101.4	101.1	....	101.3+	101.6	Neck, L.	" ....
" 24-25.	208	101.7	101.8	101.8	101.9	101.5	....	101.7+	101.9	Shld., R.	5 c. c..............
" 24-25.	209	101.1	101.3	101.9	101.9	101.4	....	101.5+	101.9	Shld., L.	4 c. c..............
" 24-25.	210	100.6	100.9	101.2	100.9	100.5	....	100.8+	101.2	"	5 c. c..............
Oct. 22-23.	214	101.5	101.7	101.8	101.4	....	10 p. m. 100.6	101.4	101.8	Neck....	10 p. m. 5. c.c. H. D. 10%. ....
" 22-23.	215	101.4	101.9	102.8	102.2	....	102.3	102.1+	102.8	"	"
" 22-23.	216	101.3	102.	101.8	101.4	....	100.8	100.5—	102.	"	"
" 22-23.	217	101.5	101.7	102.2	101.6	....	100.9	101.6—	102.2	"	10 p. m. 4. c.c. H. D. 10%. ....
" 22-23.	218	101.8	101.4	101.2	101.	....	100.5	101.2—	101.8	"	10 p. m. 5. c.c. H. D. 10%. ...
" 22-23.	219	101.8	101.6	102.3	101.3	....	101.4	101.7—	102.3	"	10 p. m. 6. c.c. H. D. 10%. ....
" 22-23.	220	101.6	101.8	102.	100.9	....	100.6	101.4	102.	" ...	10 p. m. 5. c.c. H. D. 10%. ....
" 22-23.	221	101.9	101.9	101.5	100.5	....	101.1	101.1+	101.9	"	"
" 22-23.	222	101.7	101.8	102.	101.6	....	102.	101.8+	102.	"	"
" 22-23.	223	102.	101.5	102.2	101.1	....	101.2	101.8—	102.2	"	10 p. m. 4. c.c. H. D. 10%. ....
" 22-23.	†224	100.7	100.9	102.2	101.3	....	101.5	101.3+	102.2	"	10 p. m. 5. c.c. H. D. 10%. ....
" 22-23.	225	101.2	101.6	101.7	101.3	....	101.2	101.4	101.7	"	"
" 22-23.	226	101.1	101.6	101.3	101.3	....	101.0	101.3—	101.6	"	"
" 22-23.	227	101.1	102.	100.9	101.8	....	101.3	101.4+	102.	"	"
" 22-23.	228	101.5	101.7	101.4	101.7	....	102.4	101.7+	102.4	"	10 p. m. 4. c.c. H. D. 10%. ....
" 22-23.	229	102.2	101.6	100.8	101.5	....	101.4	101.5	102.2	"	"
" 22-23.	†230	102.3	103.4	....	....	....	....	101.1—	103.4	"	....

TEMPERATURES.					Average.	Maximum.	Interval between injections and rise of temperature above maximum normal.	Duration of Rise.	Amount of Rise.	REMARKS.
AFTER										
11 a.m.	2 p.m.	5 p.m.	8 p.m.	11 p.m.			Hrs.	Hrs.	Deg.	
100.8	101.8	....	....	....	101.1	101.8	..	..	..	Negative.
99.9	101.7	....	....	....	100.7	101.7	..	..	..	"
100.9	101.	....	....	....	100.8	101.	..	..	..	"
100.4	101.5	....	....	....	100.7—	101.5	..	..	..	Negative.
100.8	101.5	....	....	....	101.—	101.5	..	..	..	"
99.9	....	101.4	....	....	100.9+	101.5	..	..	..	"
101.1	....	102.1	....	....	101.5	102.1	..	..	..	"
100.1	....	101.5	....	....	100.9+	101.5	..	..	..	"
101.2	....	103.6	....	....	102.1	103.6	19	3+	.5	"
100.8	....	101.6	....	....	101.1	101.6	..	..	..	"
101.3	....	101.6	....	....	101.4	101.6	..	..	..	Negative; healthy.
101.5	....	101.6	....	....	101.2—	101.6	..	..	..	Negative.
100.6	....	100.5	....	....	100.7+	101.1	..	..	..	"
100.7	....	101.4	....	....	101.—	101.4	..	..	..	"
100.8	....	103.5	....	....	101.6	103.5	..	..	..	"
102.9	....	101.8	....	....	102.1	102.9	..	..	..	"
101.5	....	101.4	....	....	101.2+	101.5	..	..	..	"
100.9	....	101.2	....	....	100.9+	101.2	..	..	..	"
101.3	....	101.8	....	....	101.3+	101.8	..	..	..	"
104.2	105.3	103.7	....	....	103.6+	105.3	12	9+	2.6	"
101.7	101.9	....	....	....	101.5+	101.9	..	..	..	"
	3 p.m.									
101.5	101.5	....	....	....	101.2—	101.5	..	..	..	"
101.7	101.8	....	....	....	101.5	101.8	..	..	..	"
99.8	100.4	....	....	....	100.—	100.4	..	..	..	"
101.6	100.9	....	....	....	101.3	101.6	..	..	..	"
101.5	101.	....	....	....	101.3—	101.5	..	..	..	"
101.6	101.1	....	....	....	101.4	101.6	..	..	..	"
101.	101.4	....	....	....	101.1+	101.4	..	..	..	"
100.9	100.8	....	....	....	101.+	101.4	..	..	..	"
101.6	101.3	....	....	....	100.2+	101.6	..	..	..	"
101.9	101.8	....	....	....	101.+	101.9	13	3+	.1	"
101.	101.4	....	....	....	101.—	101.4	..	..	..	"
101.7	101.7	....	....	....	101.5+	101.7	..	..	..	"
101.5	101.5	....	....	....	101.4	101.5	..	..	..	"
101.3	101.3	....	....	....	101.3—	101.3	..	..	..	"
101.3	101.7	....	....	....	101.4—	101.7	..	..	..	"
101.	101.5	....	....	....	101.1+	101.5	..	..	..	"
101.8	101.7	....	....	....	101.6+	101.8	13	3+	.6	"
101.5	102.	....	....	....	101.	101.	16—	..	.2	"
102.3	103.1	103.1	....	....	102.6+	103.1	16—	3+	.3	"
104.5	105.7	104.8	....	....	104.6	105.7	10—	9+	3.7	Condemned; lgs.
101.6	101.7	....	....	....	101.6	101.7	..	..	..	Negative.
101.9	102.1	....	....	....	101.9+	102.1	13—	3+	.3	"
101.3	101.4	....	....	....	101.4	101.4	..	..	..	"
105.6	106.3	104.9	....	....	104.9	106.3	10—	9+	4.3	Condemned; mst. and br. gl.; lgs.; mm. lc.
103.5	104.9	105.	....	....	103.8+	105.	13—	6+	3.1	Condemned; mst. and br. gl.
101.7	101.8	....	....	....	101.7	101.8	..	..	..	Negative.
100.6	100.8	102.	....	....	101.2+	102.	..	..	..	"
103.4	104.	103.3	....	....	103.8—	104.4	10—	9+	2.2	"
102.7	106.4	106.4	....	....	104.	106.4	13—	6+	4.7	Condemned; mst. gl.; lgs. mm. gl.; mm. lc.
101.2	101.6	....	....	....	101.2+	101.6	..	..	..	Negative.
102.3	101.8	....	....	....	101.7+	102.3	13—	..	.3	"
105.3	105.3	105.6	....	....	105.3	105.6	10—	9+	3.2	Condemned; mst. gl.; spl.; perit.
102.6	103.8	102.7	....		102.8—	103.8	13—	6+	1.6	Negative.
Suf	fering	from	Thrush	....			..	..	..	Test not compd.

DATE.	TAG No.	TEMPERATURES.						Average.	Maximum.	TUBERCULIN INJECTION.	
		BEFORE									
		8 a. m.	11 a. m.	2 p. m.	5 p. m.	8 p. m.	11 p. m.			Site.	Time, Amount, etc.
1896. Oct. 22-23.	231	101.3	102.5	101.7	101.5	....	101.	101.6	102.5	Neck....	10 p. m. 5. c.c. H. D. 10%, ...
" 22-23.	232	101.7	101.6	101.5	102.1	....	101.7	101.7+	102.1	"	"
" 22-23.	483	101.8	101.7	101.4	101.4	....	101.7	101.6	101.8	"	10 p. m. 4. c.c. H. D. 10%. ....
" 22-23.	484	101.1	101.	101.7	102.	....	101.6	101.5—	102.	"	10 p. m. 3. c.c. H. D. 10%. ....
" 22-23.	485	101.6	101.8	102.3	102.4	....	102.	102.3—	102.4	"	10 p. m. 4. c.c. H. D. 10%. ....
" 22-23.	486	101.4	101.6	101.8	101.	....	101.3	101.4+	101.8	"	"
" 22-23.	487	100.9	101.9	101.9	101.6	....	101.9	101.6+	101.9	"	"
" 22-23.	488	101.2	100.8	100.	101.4	....	101.	100.7+	101.4	"	10 p. m. 5. c.c. H. D. 10%. ....
" 22-23.	489	101.1	101.7	100.9	100.6	....	101.	101.1+	101.7	"	10 P. M. 4. c.c. H. D. 10%. ....
" 22-23.	490	102.8	102.4	101.6	101.	....	101.4	101.8+	102.8	"	"
" 22-23.	491	101.8	101.8	101.	101.1	....	101.1	101.4—	101.8	"	"
" 22-23.	492	102.	101.7	102.	101.4	....	101.6	101.6+	102.	"	"
" 22-23.	493	102.	102.	102.2	101.5	....	101.5	101.8+	102.2	"	"
" 22-23.	494	100.5	100.9	101.4	101.4	....	101.5	101.1+	101.5	"	10 p. m. 5. c.c. H. D. 10%. ....
" 22-23.	495	101.7	102.3	101.6	100.5	....	100.7	101.4—	102.3	"	10 p. m. 4. c.c. H. D. 10%. ....
Sept. 28-29	233	101.3	101.7	101.4	101.9	102.7	....	101.8+	102.7	"	5 c.c., V.... ....
" 28-29	†234	101.7	101.3	101.6	101.5	101.7	....	101.6—	101.7	"	" ....
" 28-29	†235	101.5	101.7	101.2	101.4	101.7	....	101.5	101.7	"	" ....
" 28-29	236	101.	101.3	101.3	101.4	101.	....	101.2—	101.4	"	" ....
" 28-29	237	101.5	101.5	101.7	102.4	101.7	....	101.3—	102.4	"	" ....
" 28-29	238	101.3	101.2	101.9	101.8	102.4	....	101.7+	101.9	"	" ....
" 28-29	239	102.1	101.8	102.1	102.4	101.9	....	102.1—	102.4	"	" ....
" 28-29	†240	101.4	101.4	101.3	101.9	101.6	....	101.5+	101.9	"	" ....
" 28-29	241	101.6	101.4	101.4	101.4	101.6	....	101.5+	101.6	"	" ....
" 28-29	242	101.5	101.6	101.5	102.4	101.8	....	101.8—	102.4	"	" ....
" 28-29	243	101.2	100.6	101.2	102.2	102.	....	101.5+	102.2	"	" ....
" 28-29	244	101.3	101.2	101.1	101.9	101.9	....	101.5—	101.9	"	" ....
" 28-29	245	101.4	101.2	102.1	101.8	101.8	....	101.7—	101.8	"	" ....
" 28-29	246	102.2	100.2	102.4	102.7	102.7	....	102.+	102.7	"	" ....
" 28-29	247	101.8	101.6	101.5	101.4	101.6	....	101.6—	101.8	"	" ....
" 28-29	248	101.5	101.4	101.5	101.5	102.4	....	101.7—	102.4	"	" ....
" 28-29	†249	101.3	101.7	100.8	101.	100.9	....	101.1+	101.7	"	" ....
" 28-29	250	101.3	100.9	102.	102.8	102.9	....	102.—	102.9	"	" ....
" 28-29	251	101.	101.2	100.8	101.7	101.3	....	101.2	101.7	"	" ....
" 28-29	†252	101.1	101.2	101.1	101.8	101.3	....	101.3	101.8	"	" ....
" 28-29	253	100.8	101.	100.9	101.6	102.7	....	101.4	102.7	"	" ....
" 28-29	254	101.7	101.4	101.3	101.9	101.4	....	101.5+	101.9	"	" ....
" 28-29	255	100.9	100.4	99.9	100.6	99.4	....	100.2+	100.9	"	" ....
" 28-29	256	100.7	101.2	101.5	102.1	101.6	....	101.4+	102.1	"	" ....
" 28-29	257	101.8	101.8	101.8	102.	102.3	....	101.9+	102.3	"	" ....
" 28-29	258	101.2	101.6	102.2	102.1	103.	....	102.+	103.—	"	" ....
" 28-29	†259	101.6	101.8	101.4	101.7	101.7	....	101.6+	101.8	"	" ....
" 28-29	260	101.4	101.2	100.9	101.2	101.4	....	101.2	101.4	"	" ....
" 28-29	261	101.5	101.9	101.7	101.9	102.9	....	102.—	102.9	"	" ....
" 28-29	262	101.5	100.5	101.6	101.7	101.5	....	101.4—	101.7	"	" ....

TEMPERATURES.										
AFTER										
11 a. m.	2 p. m.	5 p. m.	8 p. m.	11 p. m.	Average.	Maximum.	Interval between injections and rise of temperature above maximum normal.	Duration of Rise.	Amount of Rise.	REMARKS.
							Hrs.	Hrs.	Deg.	
101.2	101.7	....	....	....	101.7+	101.7	..	..	..	Negative.
101.7	101.9	....	....	....	102.2+	103.1	10—	..	1.0	"
106.	103.9	105.	....	....	105.3+	106.4	10—	9+	4.6	Condemned; mst. and br. gl.; mm. gl.; mm. lc.
101.1	101.4	....	....	....	101.1	101.4	..	..	..	Negative.
101.4	101.4	....	....	....	101.5—	101.6	..	..	..	"
103.2	105.3	106.4	....	....	104.3—	106.4	10—	9+	4.6	Condemned; mst. and br. gl.; mm. lc.
101.1	101.	....	....	....	101.2+	101.6	..	..	..	Negative.
101.3	101.9	....	....	....	101.3+	101.9	16—	..	.5	"
101.2	103.2	103.7	....	....	102.4—	103.7	16—	3+	2.0	"
101.3	101.6	....	....	....	101.4—	101.6	..	..	..	"
105.1	105.9	106.6	....	....	105.8+	106.6	10—	9+	4.8	Condemned; mst. and br. gl.; lgs.; liv.
106.4	105.2	105.3	....	....	105.1+	106.4	10—	9+	4.4	Condemned; mst. gl.; lgs.; mm. lc.
101.9	102.5	....	....	....	102.0	102.5	16—	..	.3	Negative.
102.	100.8	....	....	....	101.7	102.3	10—	3+	.8	"
102.	101.5	....	....	....	101.5+	102.	..	..	..	"
102.6	104.2	104.5	....	....	104.3	105.9	10—	9+	3.2	Condemned; mst. gl.; lgs.; mm. lc.
103.3	105.	103.8	....	....	103.5	103.8	10	9+	3.3	Negative.
104.2	103.3	101.7	....	....	103.5	105.	10	9+	3.3	"
104.9	106.7	105.7	....	...	105.+	106.7	10	9+	5.3	Condemned; mst. and br. gl.; liv.
102.5	102.3	101.7	....	....	102.4—	103.	10	3+	.6	Negative.
105.	105.	104.	....	....	104.9	105.6	10	9+	3.2	Condemned; mst. and br. gl.; pl.
100.2	102.2	101.8	....	....	101.4	102.2	..	..	..	Negative; lg.; mm. gl.; mm. lc.
102.8	103.	102.4	....	....	103.4—	105.3	10	9+	3.4	Negative.
105.8	105.8	105.6	....	....	105.6+	105.8	10	9+	4.2	Condemned; mst. and br. gl.; lgs.; mm. lc.
102.2	101.6	101.7	....	....	101.7	102.2	..	..	..	Negative.
100.4	101.3	100.5	....	....	100.7	101.3	..	..	..	"
100.5	102.2	102.2	....	....	101.6	102.2	16	3+	.3	"
105.3	105.	102.9	....	....	104.5+	105.3	10	9+	3.2	Condemned; mst. and br. gl.
100.4	102.2	100.9	....	....	101.4	102.2	..	..	..	Negative.
104.2	105.	104.2	....	....	104.5+	105.	10	9+	3.2	Condemned; mst. and br. gl.; lgs.; mm. lc.
101.9	104.	103.5	....	....	102.8+	104.	16	3+	1.6	Negative.
103.1	104.3	103.3	....	....	104.+	105.5	10	9+	3.8	"
104.6	106.3	105.2	....	....	105.4+	106.3	10	9+	3.4	Condemned; mst. and br. gl.; lgs.; mm. lc.
103.8	105.3	104.3	....	....	104.7+	105.6	10	9+	3.9	Condemned; mst. and br. gl.; lgs.; mm. gl.; abd. lc. gl.; mm. lc.
102.8	104.	104.6	....	....	103.3	104.6	13	6+	2.8	Negative.
102.9	101.9	101.8	....	....	101.9+	102.9	13	..	.2	"
101.5	102.6	101.6	....	....	101.9+	102.6	10	..	.7	"
103.2	104.8	104.9	....	....	104.4	104.9	10	9+	4.	Condemned; mst. and br. gl.; mm. lc.
102.5	100.9	100.6	....	....	101.4	102.5	13	..	.4	Negative.
102.4	102.7	102.6	....	....	102.4—	102.7	13	6	.4	"
102.	101.7	102.1	....	....	101.7+	102.1	..	..	..	"
104.2	104.6	103.	....	....	103.5—	104.6	10	9+	2.8	"
101.7	101.7	101.5	....	....	101.6	101.7	10	9+	.3	"
101.5	102.6	102.3	....	....	102.1—	102.6	..	..	..	"
101.7	101.5	101.2	....	....	101.5+	101.7	..	..	..	"

Date.	Tag No.	Temperatures.						Average.	Maximum.	Tuberculin Injection.	
		Before									
		8 a.m.	11 a.m.	2 p.m.	5 p.m.	8 p.m.	11 p.m.			Site.	Time, Amount, etc.
1896.											
Sept. 28–29	263	102.2	101.8	101.5	101.8	101.4	....	101.7+	102.2	Neck....	5 c.c., V.......
" 28–29	264	101.	101.3	101.4	101.5	100.7	....	101.2—	101.5	"	" ......
" 28–29	265	101.3	101.6	101.9	101.6	101.4	....	101.6—	101.9	"	" ....
" 28–29	266	101.2	101.5	102.1	102.9	102.	....	101.9+	102.9	"	" ....
" 28–29	267	101.	101.	101.3	100.2	100.8	....	100.9	101.2	"	" ....
" 28–29	268	101.6	101.3	101.6	102.1	102.3	....	101.8	102.3	"	" ....
" 28–29	269	101.2	101.1	101.	101.7	100.9	....	101.2	101.7	"	" ....
" 28–29	270	101.2	101.8	101.7	101.1	101.3	....	101.4	101.8	"	" ....
" 28–29	*271	101.2	101.4	101.4	101.3	100.8	....	101.2+	101.4	"	" ....
" 28–29	272	101.7	101.5	102.	101.8	101.9	....	101.8—	102.	"	" ....
" 28–29	273	101.	101.	101.3	100.2	100.8	....	100.9	101.2	"	" ....
Oct. 1–2...	274	101.3	101.6	101.8	101.3	101.5	....	101.5	101.8	"	4 c.c ....
" 1–2...	275	100.5	101.	101.6	101.2	101.2	....	101.1	101.6	"	5 c.c ....
" 1–2...	270	101.2	101.1	101.	101.7	100.9	....	101.2—	101.7	"	4 c.c ....
" 1–2...	*277	101.	101.7	101.4	101.1	100.8	....	101.2—	101.7	"	" ....
" 1–2...	278	101.5	101.8	101.7	100.8	101.3	....	101.4+	101.8	"	" ....
" 1–2...	279	101.3	101.9	101.8	101.6	101.4	....	101.6	101.9	"	" ....
" 1–2...	†280	101.8	101.4	102.2	101.4	102.5	....	101.9—	102.5	"	" ....
" 1–2...	281	102.8	103.1	101.9	101.	101.6	....	102.1—	103.1	"	" ....
" 1–2...	282	101.6	101.5	102.	101.8	101.9	....	101.8—	102.	"	" ....
" 1–2...	283	101.6	101.6	101.4	101.5	101.	....	102.4+	101.6	"	5 c.c ....
" 1–2...	284	101.3	101.1	101.4	101.2	100.9	....	101.2—	101.4	" .. .	4 c.c ....
" 1–2...	285	101.2	101.8	101.7	101.1	101.3	....	101.4+	101.8	" ...	" ....
" 1–2...	286	101.5	100.9	101.7	101.4	101.3	....	101.3—	101.7	"	" ....
" 1–2...	287	101.2	101.4	101.4	101.3	101.3	....	101.2+	101.4	"	" ....
" 1–2...	288	101.	100.8	101.3	101.	101.	....	101.1—	101.3	"	" ....
" 1–2...	289	101.	101.3	101.7	101.8	101.8	....	101.4—	101.8	"	5 c.c ....
" 1–2...	290	101.4	101.5	101.5	101.6	101.6	....	101.5—	101.6	"	4 c.c ....
" 1–2...	291	101.3	101.1	101.6	101.3	101.3	....	101.4	101.6	"	5 c.c ....
" 1–2...	292	101.6	101.2	101.7	102.5	101.4	....	101.5—	102.5	"	4 c.c ....
" 1–2...	293	100.	100.9	100.8	101.6	102.	....	101.1—	102.	"	" ....
" 1–2...	294	100.8	101.	102.2	101.4	101.4	....	101.4—	102.2	"	" ....
" 1–2...	295	101.5	101.5	101.2	101.5	101.3	....	101.4	101.5	"	" ....
" 1–2...	296	101.4	101.4	101.5	101.5	101.4	....	101.4+	101.5	"	" ....
" 1–2...	297	101.3	101.	101.5	101.4	100.8	....	101.2	101.5	"	5 c.c ....
" 1–2...	298	100.5	100.9	101.2	101.3	101.4	....	100.9	101.4	"	" ....
" 1–2...	299	101.	100.6	101.5	101.	101.2	....	101.1—	101.5	"	" ....
" 1–2...	†300	101.1	100.5	101.2	100.9	101.3	....	101.	101.3	"	4 c.c ....
" 1–2...	301	100.6	100.	101.2	101.6	101.2	....	100.9+	101.6	"	5 c.c ....
" 1–2...	302	101.4	101.5	101.8	101.7	101.6	....	101.6—	101.8	"	" ....
" 1–2...	303	101.5	101.7	102.1	101.8	101.6	....	101.6+	102.1	"	4 c.c ....
" 1–2...	304	101.	101.4	101.6	101.2	101.1	....	101.3—	101.6	"	" ....
" 1–2...	305	101.8	101.2	102.3	102.4	102.1	....	101.9+	102.4	"	" ....
" 1–2...	306	101.6	101.3	103.	104.2	103.6	....	102.6+	104.2	"	" ....
" 1–2...	307	102.5	102.7	103.	103.8	102.8	....	102.9+	103.8	"	" ....
" 1–2...	308	101.1	101.5	101.8	102.4	100.8	....	101.5+	102.4	"	" ....
" 8–9...	309	101.5	101.5	101.3	101.8	101.6	....	101.5+	101.8	"	2.5 c.c., U. S....
" 8–9...	310	101.4	101.4	101.2	101.5	101.4	....	101.4—	101.5	"	" ....
" 8–9...	311	101.4	101.3	101.5	101.9	100.5	....	101.3+	101.9	"	" ....
" 8–9...	312	100.9	101.2	101.3	101.	99.6	....	100.8	101.3	"	" ....
" 8–9...	313	100.8	100.6	101.	101.7	100.3	.. .	100.9—	101.7	"	" ....
" 8–9...	314	100.8	100.6	100.5	100.5	100.4	....	100.6—	100.8	"	" ....
" 8–9...	315	101.3	101.2	101.1	101.2	100.6	....	101.1—	101.3	"	" ....
" 8–9...	316	101.3	101.2	101.4	101.2	101.2	....	101.3—	101.4	"	" ....
" 8–9...	317	102.6	102.7	101.6	101.6	101.4	....	102.—	102.7	"	" ....
" 8–9...	318	102.6	102.9	103.5	102.4	101.3	....	102.5+	103.5	"	" ....

TEMPERATURES.					Average.	Maximum.	Interval between injections and rise of temperature above maximum normal.	Duration of Rise.	Amount of Rise.	REMARKS.
AFTER										
11 a. m.	2 p. m.	5 p. m.	8 p. m.	11 p. m.						
							Hrs.	Hrs.	Deg.	
101.7	101.4	101.6	....	....	101.4+	101.7	..	..	..	Negative.
106.1	104.5	104.2	....	....	105.+	106.1	10	9+	4.6	Condemned; mst. and br. gl.; mm. lc.
101.1	101.5	101.2	....	....	101.3—	101.5	..	..	..	Negative.
104.9	105.5	105.	....	....	105.2	105.5	10	9—	2.6	Condemned; mst. and br. gl.; lgs.
101.4	100.2	....	....	....	100.8+	101.4	13	..	.2	Negative; abd.; lc. gl.
101.9	101.1	....	....	....	101.5+	101.9	..	..	..	Negative.
101.8	102.6	....	....	....	101.8+	102.6	13—	3+	9	“
101.8	102.4	....	....	....	102.	102.4	16—	..	6	“
101.1	100.5	....	....	....	100.3+	100.7	..	..	..	Negative; all parts healthy.
102.7	103.5	....	....	....	102.4+	103.5	13—	3+	1.5	Negative.
101.4	100.2	....	....	....	100.8+	101.4	13—	..	.2	“
102.6	103.2	103.3	....	....	102.8+	103.3	10	12+	1.5	“
101.7	102.1	101.5	....	....	101.7	102.1	13	6+	.5	“
101.8	102.6	101.8	....	....	101.8+	102.6	13	12+	.9	“
101.8	101.5	101.3	....	....	101.4+	101.8	13	3+	.1	Negative; all parts healthy.
104.5	104.6	103.8	....	....	103.8	104.6	10	12+	2.8	Condemned; lgs.; liv.
105.5	105.7	105.9	....	....	104.9—	105.9	10	12+	4.	Condemned; mst. gl.; mm. lc.
102.4	103.6	105.	....	....	103.1+	105.	16	6+	2.5	Negative.
105.4	105.9	105.6	....	....	104.9+	105.9	13	6+	2.8	Condemned; mst. and br. gl.; mm. lc.
102.7	103.5	102.3	....	....	102.4+	103.5	13	6+	1.5	Negative.
101.7	101.7	100.9	....	....	101.3+	101.7	13	3	.1	“
102.2	102.	101.6	....	....	101.8+	102.2	10	9+	.8	“
....	102.4	102.9	....	....	102.	102.9	16	6+	1.1	“
103.6	104.5	105.6	....	....	103.9—	105.6	10	12+	3.9	Condemned; mst. and br. gl.; lgs.; liv.; mm. lc.
101.1	100.5	100.9	....	....	100.3+	101.1	..	..	..	Negative.
104.6	104.6	104.2	....	....	104.1+	104.6	10	12+	3.3	Condemned; mst. and br. gl.; pr.; prcd.; lgs.; mm. lc.
101.3	101.4	101.7	....	....	100.4+	101.7	..	..	..	Negative.
102.9	103.9	103.	....	....	103.	103.9	10	9+	2.3	“
103.1	102.1	101.4	....	....	102.2	103.1	10	6+	1.5	“
101.6	101.8	101.7	....	....	101.6	101.8	..	..	..	“
100.6	101.3	102.	....	....	101.2—	102.	..	..	..	“
101.1	101.1	101.2	....	....	101.2	101.4	..	..	..	“
105.7	105.9	106.2	....	....	106.1+	106.8	10	12—	5.3	Condemned; mst. and br. gl.; lgs.; mm. lc.
101.2	101.8	101.8	....	....	101.4+	101.8	16	3+	.3	Negative.
105.2	105.8	105.5	....	....	104.8	105.8	10	12—	4.3	Condemned; mst. and br. gl.; lgs.; liv.; mm. lc.
101.4	101.8	101.2	....	....	101.5—	101.8	10	6	.4	Negative.
106.1	105.	105.2	....	....	105.	106.1	10	12—	4.6	Condemned; mst. and br. gl.; lgs.; liv.; mm. lc.
102.7	104.5	104.7	....	....	103.3	104.7	13	9—	3.4	Negative.
101.1	101.7	101.3	....	....	101.2+	101.7	16	3—	.1	“
101.1	101.8	102.6	....	....	101.7+	102.6	19	3+	.8	“
101.9	101.9	101.9	....	....	101.7+	101.9	..	..	..	“
101.1	101.1	101.5	....	....	101.3	101.5	..	..	..	“
105.9	105.4	104.8	....	....	105.6+	106.4	10	9+	4.	Condemned; mst. and br. gl.; lgs.; liv.; mm. lc.
101.1	103.9	103.5	....	....	102.5	103.9	..	..	..	Negative.
102.6	102.5	102.6	....	....	102.5+	102.6	..	..	..	“
101.7	103.5	103.6	....	....	102.8	103.6	16	3+	1.2	“
101.4	102.	....	....	....	101.6+	102.	16	3+	.2	“
101.5	101.9	....	....	....	101.7+	101.9	16	3+	.4	“
101.5	101.6	....	....	....	101.7—	101.9	..	..	..	“
100.7	101.5	....	....	....	100.9+	101.5	16	3+	.2	“
101.3	101.4	....	....	....	101.2+	101.4	..	..	..	“
101.4	101.5	....	....	....	101.4	101.5	10	6+	.7	“
101.1	101.	....	....	....	100.8+	101.1	..	..	..	“
101.4	101.8	....	....	....	101.5+	101.8	16	..	.1	“
101.8	102.2	....	....	....	101.8—	102.2	..	..	..	“
101.8	102.7	....	....	....	101.9	102.7	..	..	..	“

DATE.	TAG No.	TEMPERATURES.						Average.	Maximum.	TUBERCULIN INJECTION.	
		BEFORE									
		8 a. m.	11 a. m.	2 p. m.	5 p. m.	8 p. m.	11 p. m.			Site.	Time, Amount, etc.
1896. Oct. 8-9...	319	103.6	102.6	103.6	101.8	100.	....	102.3+	103.6	Neck....	2.5 c. c, U. S......
" 8-9...	320	101.6	101.8	102.3	101.4	100.9	....	101.6—	102.3	"	" ......
" 8-9...	321	101.8	101.5	101.3	100.8	100.8	....	102.+	101.8	"	" ......
" 8-9...	†322	101.6	101.6	101.3	101.4	100.5	....	101.3—	101.6	"	" ......
" 8-9...	323	101.8	101.4	101.7	101.1	100.8	....	101.4—	101.8	"	" ......
" 8-9...	324	101.9	101.4	101.3	101.2	100.8	....	101.3+	101.9	"	" ......
" 8-9...	*325	101.3	101.2	101.9	101.3	100.4	....	101.2+	101.9	"	" ......
" 8-9...	326	102.1	102.1	102.1	101.7	101.4	....	101.9—	102.1	"	" ......
" 8-9...	327	102.2	100.9	101.7	100.7	100.6	....	101.2+	102.2	"	" ......
" 8-9...	328	101.6	100.8	101.1	100.4	100.4	....	100.9—	101.6	"	" ......
" 8-9...	329	101.3	101.4	101.6	101.	100.2	....	101.3	101.6	"	" ......
" 8-9...	330	102.6	101.6	102.5	100.7	99.8	....	101.4+	102.6	"	" ......
" 8-9...	331	101.3	100.6	102.5	101.1	101.6	....	101.4+	102.5	"	" ......
" 8-9...	†332	101.9	101.2	101.6	101.	100.9	....	101.3+	101.9	"	" ......
" 8-9...	333	102.4	102.1	102.1	101.4	101.1	....	101.8+	102.4	"	" ......
" 8-9...	334	101.6	101.1	101.9	100.9	100.1	....	101.1+	101.6	"	" ......
" 8-9...	335	102.4	101.6	101.9	101.1	101.7	....	101.7+	102.4	"	" ......
" 8-9...	336	102.7	102.5	102.4	102.	102.	....	102.3+	102.7	"	" ......
" 8-9...	337	101.4	100.7	101.2	100.6	100.7	....	100.9+	101.4	"	" ......
" 8-9...	338	103.4	103.2	104.2	102.6	101.3	....	102.9+	104.2	"	" ......
" 8-9...	339	101.3	101.	101.8	101.1	101.5	....	101.3+	101.8	"	" ......
" 8-9...	340	102.2	102.5	101.1	102.	101.	....	101.8—	102.5	"	" ......
" 8-9...	341	101.6	101.2	102.6	100.7	99.8	....	101.2—	102.6	"	" ......
" 8-9...	342	101.3	100.7	101.7	100.1	100.8	....	100.9+	101.7	"	" ......
" 8-9...	*343	102.	101.7	102.1	100.9	100.9	....	101.5+	102.1	"	" ......
" 12-13.	344	101.2	100.6	101.1	100.7	100.	....	100.7+	101.2	"	" ......
" 12-13.	345	101.3	100.7	101.4	102.1	100.4	....	101.2—	102.1	"	" ......
" 12-13.	346	101.8	101.5	101.3	101.5	100.7	....	101.4—	101.8	"	" ......
" 12-13.	347	101.4	100.2	101.8	100.3	100.3	....	100.8	101.8	"	" ......
" 12-13.	348	101.6	101.4	101.5	101.7	99.8	....	101.2	101.7	"	" ......
" 12-13.	349	101.3	101.	101.5	101.8	100.6	....	101.2	101.8	"	" ......
" 12-13.	350	101.3	101.1	101.	101.8	100.1	....	101.1	101.8	"	" ......
" 12-13.	351	101.1	100.4	101.6	101.6	100.	....	100.9+	101.6	"	" ......
" 12-13.	352	101.3	101.3	101.3	101.6	100.9	....	101.3—	101.6	"	" ......
" 12-13.	353	100.5	100.8	101.4	101.2	100.2	....	100.8+	101.4	"	" ......
" 12-13.	354	101.	100.6	101.1	100.8	99.5	....	100.6	101.1	"	" ......
" 12-13.	355	101.3	101.	100.7	99.9	99.1	....	100.4	101.3	"	" ......
" 12-13.	356	101.2	100.1	101.	101.3	99.9	....	101.9	101.3	"	" ......
" 12-13.	357	99.6	100.9	101.2	101.7	100.6	....	100.8	101.7	"	" ......
" 15-16.	358	101.9	102.4	102.4	101.8	....	101.2	101.9+	102.4	"	{12 p.m., 4 c. c., 10% H. D.....}
" 15-16.	359	101.3	101.2	102.	101.	....	101.3	101.4—	102.	"	"
" 15-16.	360	101.7	102.3	101.7	101.8	....	100.8	101.7—	102.3	"	"
" 15-16.	361	101.	101.8	101.8	101.3	....	101.7	101.5+	101.8	"	"
" 15-16.	362	101.8	101.8	102.4	102.4	....	101.4	102.—	102.4	"	"
" 15-16.	363	102.	102.4	102.4	102.	....	101.4	102.+	102.4	"	"
" 15-16.	364	101.7	102.	102.1	101.8	...	101.	101.7	102.1	"	"
" 15-16.	*365	101.7	102.2	102.5	101.	101.2	....	101.7+	102.5	"	{10 p. m., 5 c. c., U. S..........}
" 15-16.	367	100.9	101.5	101.9	102.2	102.1	....	101.7+	102.2	"	"
" 15-16.	369	100.4	101.1	102.1	102.	....	101.6	101.4+	102.1	"	{12 p. m., 4 c. c., 10% H. D.....}
" 15-16.	370	101.3	101.	101.7	102.	....	101.2	101.4+	102.	"	"
" 15-16.	371	101.7	102.	101.8	101.7	....	101.	101.6+	102.	"	"
" 15-16.	372	101.6	101.2	102.	101.8	....	101.4	101.6	102.	"	"
" 15-16.	373	101.5	101.8	102.2	102.1	....	101.	101.7+	102.2	"	"
" 15-16.	374	101.7	101.7	102.6	102.	....	100.6	101.7+	102.6	"	"
" 15-16.	375	102.6	102.2	102.5	102.7	....	100.	102.	102.6	"	"
" 15-16.	376	101.1	101.9	101.9	102.2	....	100.4	101.5—	102.2	"	"

	TEMPERATURES.					Average.	Maximum.	Interval between injections and rise of temperature above maximum normal.	Duration of Rise.	Amount of Rise.	REMARKS.
	AFTER										
..	11 a. m.	2 p. m.	5 p. m.	8 p. m.	11 p. m.			Hrs.	Hrs.	Deg.	
3	101.	101.2	....	....	....	101.2	101.3	..	..	..	Negative.
3	101.	100.8	....	....	....	101.+	101.3	..	..	..	"
5	100.9	101.4	....	....	....	101.3—	101.5	..	..	..	"
	101.5	104.3	103.9	....	....	102.7	104.3	16—	6+	2.7	"
6	100.7	102.	....	....	....	101.1	102.	..	..	..	"
7	100.5	101.4	....	....	....	101.2	101.7	..	..	..	"
	100.7	101.	....	....	....	100.9	101.	..	..	..	Negative; all parts healthy.
3	102.4	102.4	....	....	....	102.4	102.4	10—	9+	.3	Negative.
3	101.	101.2	....	....	....	101.2	101.3	..	..	..	"
	101.1	101.3	....	....	....	101.1+	101.3	..	..	..	"
5	101.	100.3	....	....	....	100.6	101.	..	..	..	"
2	101.	100.9	....	....	....	101.+	101.2	..	..	..	"
9	101.2	101.2	....	....	....	101.4+	101.9	..	..	..	"
4	102.	105.6	105.7	....	....	103.7—	105.7	13—	6+	3.8	"
7	101.6	101.7	....	....	....	101.7—	101.7	..	..	..	"
6	100.8	101.5	....	....	....	101.3	101.6	..	..	..	"
3	101.	101.4	....	....	....	101.2+	101.4	..	..	..	"
4	104.1	105.8	106.5	....	....	104.7	106.5	13—	9+	3.8	Condemned; mst. and br. gl.; lgs.; liv.; mm. lc.
	100.4	101.1	....	....	....	100.3+	101.1	..	..	..	Negative.
4	101.2	101.2	....	....	....	100.8+	101.2	..	..	..	"
	100.4	100.9	....	....	....	100.4+	100.9	..	..	..	"
4	100.4	101.8	....	....	....	100.9—	101.8	..	..	..	"
2	99.4	100.	....	....	....	99.5+	100.	..	..	..	"
	99.2	100.8	....	....	....	100.	100.8	..	..	..	"
3	101.5	101.2	....	....	....	101.3	101.5	..	..	..	Negative; all parts healthy.
.	10 A. M. 104.2	105.4	106.	....	....	105.2	106.	12—	9+	4.8	Condemned; mst. and br. gl.; lgs.; mm. lc.
.	101.2	101.3	101.5	....	....	101.3+	101.5	..	..	..	Negative.
.	101.2	101.4	101.2	....	....	101.3—	101.4	..	..	..	"
.	100.9	101.9	102.	....	....	101.6	102.	16—	3+	.2	"
.	101.1	101.5	101.4	....	....	101.3+	101.5	..	..	..	"
.	101.	101.8	101.2	....	....	101.3+	101.8	..	..	..	"
.	101.4	101.2	101.2	....	....	101.3	101.4	..	..	..	"
.	101.6	101.4	101.7	....	....	101.6—	101.7	19—	3—	.1	"
.	101.9	102.4	101.8	....	....	102.+	102.4	12—	9+	.8	"
.	101.7	101.	101.4	....	....	101.4—	101.7	12—	3—	.3	"
.	100.9	101.1	101.	....	....	101.	101.1	..	..	..	"
.	101.9	101.7	101.9	....	....	101.8+	101.9	12—	9+	.6	"
.	10. 101.	100.6	100.5	....	....	100.7	101.	..	..	..	"
.	100.7	101.3	100.6	....	....	100.9—	101.3	..	..	..	"
	105.7	105.1	....	....	....	105.9+	107.	8—	6+	4.6	Condemned; mst. gl.; liv.; mm. gl.
9	101.2	101.2	....	....	....	101.4	102.2	..	..	..	Negative.
6	101.8	102.	....	....	....	101.8	102.	..	..	..	"
6	101.	101.3	....	....	....	101.3	101.6	..	..	..	"
1	102.1	103.	103.2	....	....	102.6	103.2	14—	3+	.8	"
8	103.8	103.5	103.8	....	....	103.5—	103.8	8—	9+	1.4	"
6	105.9	104.5	....	....	....	105.3+	105.9	8—	6+	3.8	Condemned; lgs.; mm. gl.; mm. lc.
	101.8	102.	....	....	....	101.9+	102.	..	..	..	Negative; all parts healthy.
4	101.5	102.	....	....	....	101.6+	102.	..	..	..	Negative.
8	101.8	102.2	....	....	....	101.9+	102.2	14—	..	.1	"
7	101.6	100.8	102.	....	....	101.5+	101.7	..	..	..	"
8	101.8	102.7	102.2	....	....	102.1+	102.7	14—	3+	.7	"
8	101.6	101.6	....	....	....	101.3+	101.6	..	..	..	"
4	107.2	105.4	103.5	....	....	105.6+	107.2	8—	9+	5.	Condemned; lgs.; mst. and br. gl.
6	105.9	106.4	106.6	....	....	104.9—	106.6	11—	6+	4.	Condemned; mst. gl.; mm. lc.
4	106.2	105.6	105.8	....	....	106.	106.4	8—	9+	3.8	Condemned; mst. gl.; mm. lc.
2	101.5	102.6	....	....	....	101.8+	102.6	14—	..	.4	Negative.

DATE.	TAG No.	TEMPERATURES.								TUBERCULIN INJECTION.	
		BEFORE									
		8 a. m.	11 a. m.	2 p. m.	5 p. m.	8 p. m.	11 p. m.	Average.	Maximum.	Site.	Time, Amount, etc.
1896. Oct. 15-16.	379	101.2	102.1	102.1	101.8	....	100.9	101.6+	102.1	Neck....	12 p. m., 4 c. c., H. D.........
" 15-16.	381	101.6	101 5	102.5	102.1	101.4	....	101.8+	102.5	"	10 p. m., 3 c. c., U.S..........
" 15-16.	382	100.	101.7	101.6	101.4	....	99.8	100.9	101.7	"	12 p. m., 4 c. c., H. D.........
" 15-16.	383	101.3	101.7	103.3	102.4	100.	....	101.7+	103.3	"	10 p. m., 3 c. c., U.S........
" 15-16.	384	101.	102.	102.4	102.2	....	100.	615.+	102.4	"	12 p. m., 4 c. c., H. D.........
" 15-16.	385	102.	102.1	103.1	102.6	102.1	....	102.4—	103.1	"	10 p. m., 3 c. c., U. S..........
" 15-16.	387	101.1	101.9	101.6	101.2	....	101.	101.4—	101.9	"	12 p. m., 4 c. c., H. D.........
" 15-16.	*388	101.5	101.7	102.2	101.4	....	101.2	101.6	102.2	"	"
" 15-16.	389	101.5	102.	102.3	102.1	....	101.6	101.9	102.3	"	"
" 15-16.	390	101.2	101.6	102.	101.8	....	101.	101.5+	102.	"	"
" 15-16.	391	102.	102.	102.7	102.5	....	100.6	102.—	102.7	"	"
" 15-16.	392	101.7	101.4	103.3	102.9	....	102.5	102.4—	103.3	"	"
" 15-16.	393	101.9	101.9	102.2	102.7	....	101.6	102.1—	102.7	"	"
" 15-16.	394	101.7	102.3	102.1	102.3	....	101.	101.9—	102.3	"	"
" 15-16.	395	102.3	102.2	102.6	102.6	....	101.	102.1+	102.6	"	"
" 15-16.	396	103.	102.6	103.	102.7	101.7	....	102.6	103.	"	10 p. m., 3 c. c., U. S..........
" 15-16.	397	101.3	101.4	101.5	101.5	99.6	....	101.1—	101.5	"	"
" 15-16.	398	101.	101.3	102.5	102.3	101.1	....	101.6+	102.5	"	"
" 15-16.	399	101.3	101.8	101.4	101.7	101.5	....	101.5+	101.8	"	"
" 15-16.	401	102.	102.2	102.	101.8	101.4	....	101.8+	102.2	"	"
" 15-16.	403	103.4	101.8	101.6	101.8	....	101.2	102.—	103.4	"	"
" 15-16.	404	101.9	102.5	102.1	101.4	....	101.9	102.—	102.5	"	"
" 15-16.	405	102.3	102.	101.9	100.7	....	100.4	101.4+	102.3	"	"
" 15-16.	406	101.1	102.3	102.2	101.4	....	100.6	101.5+	102.3	"	"
" 15-16.	407	101.8	102.5	102.3	101.4	....	100.7	101.7+	102.5	"	"
" 15-16.	408	102.2	102.7	103.6	102.2	....	101.6	102.4+	103.6	"	"
" 15-16.	409	101.2	101.8	102.3	99.7	....	100.	101.	102.3	"	"
" 15-16.	412	101.1	101.6	101.4	101.	....	100.6	101.1+	101.6	"	"
" 15-16.	413	101.8	103.2	103.9	101.	....	101.4	102.2+	103.9	"	"
" 15-16.	414	102.	102.6	103.4	101.6	....	101.5	102.1+	103.4	"	"
" 15-16.	416	101.2	102.1	102.5	101.8	....	101.2	101.8—	102.5	"	"
" 15-16.	*417	100.7	100.9	101.3	101.1	....	100.2	100.8+	101.3	"	"
" 15-16.	419	101.2	102.	102.7	101.2	101.	....	101.6+	102.7	"	10 p.m., 3 c.c., U. S.
" 15-16.	420	102.4	101.8	101.7	101.	100.4	....	101.6+	102.4	"	"
" 15-16.	421	102.5	103.2	103.	104.6	....	102.5	103.2—	104.6	"	12 p.m., 4 c.c., H.D.
" 15-16.	422	102.2	102.	102.1	102.4	....	100.4	101.8+	102.4	"	"
" 15-16.	423	102.6	101.9	101.7	102.4	100.	....	101.7+	102.6	"	10 p.m., 3 c.c., U.S.
" 15-16.	424	101.6	101.8	101.2	101.4	....	100.3	101.2+	101.8	"	12 p.m., 4 c.c., H.D.
" 15-16.	426	102.	101.8	101.8	101.2	101.2	....	101.6	101.8	"	10 p.m., 3 c.c., U.S.
" 15-16.	*427	101.4	101.3	101.3	100.4	101.6	....	101.2	101.6	"	"
" 15-16.	428	101.4	102.1	102.3	100.5	....	100.9	101.4+	102.3	"	12 p.m., 4 c.c., H.D.
" 15-16.	430	101.2	101.2	102.	101.	101.3	....	101.3+	101.3	"	10 p.m., 3 c.c., U.S.
" 15-16.	431	101.3	101.5	101.4	101.5	....	101.5	101.5+	101.5	"	12 p.m., 4 c.c., H.D.
" 15-16.	433	102.	102.7	101.7	101.8	....	100.2	101.7—	102.7	"	"
" 15-16.	435	102.	102.	102.	101.7	....	100.6	101.7	102.	"	"
" 15-16.	436	101.4	101.2	102.	101.7	....	100.8	101.4+	102.	"	"
" 15-16.	437	101.3	101.1	101.5	101.2	101.4	....	101.3	101.5	"	10 p.m., 3 c.c., U.S.
" 15-16.	438	101.6	102.	101.5	101.3	100.4	....	101.4—	101.6	"	"
" 15-16.	439	102.4	102.4	102.2	102.2	....	101.7	102.2—	102.4	"	12 p.m., 4 c.c., H.D.
" 15-16.	440	102.	101.8	101.8	101.8	....	101.	101.7—	101.8	"	"
" 15-16.	441	102.8	102.6	102.1	100.6	101.6	....	102.—	102.8	"	10 p.m., 3 c.c., U.S.
" 15-16.	442	102.	101.7	102.	101.	100.9	....	101.5+	102.	" ...	"

TEMPERATURES.											
AFTER						Average.	Maximum.	Interval between injections and rise of temperature above maximum normal.	Duration of Rise.	Amount of Rise.	REMARKS.
3 m.	11 a.m.	2 p.m.	5 p.m.	8 p.m.	11 p.m.			Hrs.	Hrs.	Deg.	
4.2	105.3	104.8	104.2	....	....	104.6+	105.3	8—	9+	3.2	Condemned; mst. gl.; lgs.; mm. lc.
6.5	105.	103.4	104.2	....	....	104.8—	106.5	10—	9+	4.	Condemned; mst. and br. gl.; mm. gl.
1.	101.4	102.3	....	....	....	101.6—	102.3	14—	..	.6	Negative.
1.5	102.5	102.2	....	....	....	102.1—	102.5	..	..	..	"
1.5	101.4	101.6	....	....	....	101.5	101.6	..	..	..	"
1.1	101.6	102.5	....	....	....	101.7+	102.5	..	..	..	"
4.4	103.8	105.7	104.1	....	....	104.5	105.7	8—	9+	3.8	Condemned; mst. and br. gl.; mm. gl.; mm. lc.
1.3	101.6	102.2	....	....	....	101.7	102.2	..	..	..	Negative; all parts healthy.
5.6	105.2	103.9	103.2	....	....	104.5—	105.6	8—	9+	3.3	Condemned; mst. and br. gl.; mm. gl.
0.8	101.6	101.7	....	....	....	101.4—	101.7	..	..	..	Negative.
1.5	101.5	102.	....	....	....	101.7—	102.	..	..	..	"
1.7	101.2	101.9	....	....	....	101.6	101.9	..	..	..	"
2.2	103.7	102.7	....	....	....	102.9—	103.7	11—	..	1.	"
1.3	101.6	102.	103.	....	....	102.—	103.	17—	..	.7	"
3.4	106.5	105.2	104.6	....	....	104.9—	106.5	8—	9+	3.9	Condemned; mst. and gl.; lgs.
4.4	106.	104.6	104.7	....	....	104.9+	106.	10—	9+	3.	Condemned; mst. and br. gl.; mm. lc.
2.3	104.8	105.1	....	....	....	104.1—	105.1	10—	6+	3.6	Condemned; mst. and br. gl.; mm. lc.
1.1	101.5	103.7	....	....	....	102.1	103.7	16—	..	1.2	Negative.
5.6	107.	104.5	104.	....	....	105.3—	107.	10—	9+	5.2	Condemned; mst. and br. gl.; mm. gl.
1.2	101.5	101.6	....	....	....	101.4+	101.6	..	..	..	Negative.
0.8	100.8	101.	....	....	....	100.9—	101.	..	..	..	"
2.5	101.8	102.1	....	....	....	102.1+	102.5	..	..	..	"
0.8	100.9	101.8	104.	....	....	101.9—	104.	17—	..	1.7	"
9.5	101.5	101.5	....	....	....	100.8+	101.5	..	..	..	"
2.1	102.	101.8	....	....	....	102.—	102.1	..	..	..	"
2.2	103.6	105.2	105.5	....	....	104.1+	105.5	14—	3+	1.9	"
1.3	101.2	101.5	....	....	....	101.3+	101.5	..	..	..	"
1.1	101.5	101.3	....	....	....	101.3	101.5	..	..	..	"
1.1	101.1	102.8	....	....	....	101.7+	102.8	..	..	..	"
1.5	102.	102.2	....	....	....	101.9—	102.2	..	..	..	"
2.1	101.8	102.	....	....	....	102.—	102.1	..	..	..	"
0.8	101.3	101.7	...	....	....	101.3—	101.7	14	..	.4	Negative; all parts healthy.
0.6	100.8	101.4	....	....	....	101.—	100.8	..	..	..	"
2.5	102.7	103.2	104.	....	....	103.1	104.	10—	9+	1.6	"
4.	103.2	102.3	....	....	....	103.2—	104.	..	..	..	"
0.7	100.8	101.5	....	...	....	101.	101.5	..	..	..	"
6.3	105.—	104.6	104.	....	....	105.—	101.3	10	9+	3.7	Condemned; mst. and br. gl.; lgs; mm. lc.
1.3	101.5	102.1	....	....	....	101.8+	102.1	14	..	.3	"
0.	101.5	100.8	....	....	....	100.8—	101.5	..	..	..	"
2.	104.5	104.	....	....	....	103.5	104.5	10—	6+	2.9	Negative; all parts healthy.
1.8	104.4	104.5	....	....	....	103.6—	104.5	11—	3+	2.2	"
1.5	101.5	101.4	....	....	....	101.5—	101.5	..	..	..	"
2.1	101.6	102.	....	....	....	101.9	102.1	8—	6+	.6	"
1.8	102.3	102.4	....	....	....	102.2—	102.4	..	..	..	"
1.4	101.5	101.5	102.5	....	....	101.7+	102.5	17—	..	.5	"
2.	101.3	102.	....	...	....	100.5	102.	..	..	..	"
1.1	101.1	101.4	....	....	....	101.2	101.4	..	..	..	"
1.	101.	102.	....	....	....	101.3+	102.	16—	..	.4	"
2.2	101.4	100.5	....	....	....	101.4—	102.2	..	..	..	"
1.2	101.8	103.2	....	....	....	102.1—	103.2	14—	..	1.4	"
3.2	106.	104.1	103.8	....	....	105.5+	106.2	10—	9+	5.4	Condemned; mst. gl.; lgs; liv.; mm. lc.
5.6	106.1	105.4	106.1	....	....	106.+	105.6	10—	9+	4.6	Condemned; mst. gl.; mm. lc.

DATE.	TAG No.	TEMPERATURES.								TUBERCULIN INJECTION.	
		BEFORE									
		8 a. m.	11 a. m.	2 p. m.	5 p. m.	8 p. m.	11 p. m.	Average.	Maximum.	Site.	Time, Amount, etc.
1896. Oct. 15-16.	444	101.4	101.5	102.5	101.6	101.8	....	101.8—	102.5	Neck....	10 p. m., 3 c. c., U. S.
" 15-16.	445	101.	102.1	101.8	101.8	....	100.8	101.5	102.1	"	12 p.m., 4 c.c., H.D.
" 15-16.	446	102.	102.6	101.4	101.5	....	101.3	101.8—	102.6	"	"
" 15-16.	447	101.4	101.9	102.3	102.5	....	101.5	101.9+	102.5	"	"
" 15-16.	448	101.4	101.6	101.4	100.4	100.	....	101.—	101.6	"	10 p.m., 3 c.c., U.S.
" 15-16.	450	102.1	101.5	101.2	102.4	....	100.5	101.5+	102.4	"	12 p.m., 4 c.c., H.D.
" 15-16.	451	102.8	101.7	102.	102.2	101.	....	101.7—	102.8	"	10 p.m., 3 c.c., U.S.
" 15-16.	452	101.8	101.5	101.4	101.8	....	101.1	101.5+	101.8	"	12 p.m., 4 c.c., H.D.
" 15-16.	453	102.2	102.	102.	101.7	....	100.7	101.7+	102.2	"	"
" 15-16.	†454	103.2	103.6	106.5	....	....	....	....	106.5	....	....
" 15-16.	455	101.8	101.7	102.	102.3	....	101.4	101.8+	102.3	Neck....	12 p.m., 4 c.c., H.D.
" 15-16.	457	101.6	101.5	101.2	101.8	....	101.3	101.5	101.8	"	"
" 15-16.	458	102.	101.9	102.	102.	....	100.9	101.8—	102.	"	"
" 15-16.	459	100.5	101.	102.	102.	....	100.3	101.2—	102.	"	"
" 15-16.	460	101.5	101.8	102.5	102.6	....	100.6	101.8	102.6	"	"
" 15-16.	461	101.7	101.7	103.	102.4	....	101.6	102.1—	103.	"	"
" 15-16.	462	104.1	103.8	102.5	...	99.6	....	102.5	104.1	"	10 p.m., 3 c.c., U.S.
" 15-16.	463	101.5	101.5	102.	101.2	....	101.1	101.5—	102.	"	12 p.m., 4 c.c., H.D.
" 15-16.	464	101.3	101.8	102.2	102.	....	101.2	101.7	102.2	"	"
" 15-16.	465	101.5	101.6	102.	101.6	....	100.8	101.5	102.	" ...	"
" 15-16.	467	102.	100.9	101.5	101.7	....	99.7	101.2—	102.	"	"
" 15-16.	468	101.6	102.	102.	102.	102.1	....	102.—	102.1	"	10 p.m., 3 c.c., U.S.
" 15-16.	469	101.8	102.2	101.9	102.5	....	100.6	101.8	102.5	"	12 p.m., 4 c.c., H.D.
" 15-16.	470	101.6	102.3	102.2	102.	....	100.6	101.7+	103.	"	"
" 15-16.	471	101.4	101.2	102.6	102.	....	100.8	101.6	102.6	"	"
" 15-16.	473	101.3	102.	102.2	102.2	....	100.9	101.7+	102.2	"	"
" 15-16.	*475	102.2	102.2	102.4	102.6	102.	....	102.3—	102.6	"	10 p.m., 3 c.c., U.S.
" 15-16.	476	102.	101.3	101.9	101.5	....	100.4	101.4+	102.	"	12 p.m., 4 c.c., H.D.
" 15-16.	477	101.5	102.1	102.2	102.5	101.4	....	102.—	102.5	"	10 p.m., 3 c.c., U.S.
" 15-16.	478	101.8	101.5	101.7	102.3	101.9	....	101.8+	102.3	"	"
" 15-16.	479	100.8	102.1	103.1	103.2	102.2	....	102.3—	103.2	"	"
" 15-16.	*480	100.7	101.2	101.4	102.	100.4	....	101.1+	102.	"	"
" 15-16.	481	100.	101.1	101.6	102.6	99.7	....	101.	102.6	"	"
" 15-16.	482	102.	102.3	102.6	101.6	101.3	....	102.—	102.6	"	"
" 15-16.	496	100.7	101.9	102.2	101.1	....	101.7	101.5+	102.2	"	10 p. m., 5 c. c......
" 15-16.	497	101.8	101.2	101.7	100.8	....	101.3	101.4—	101.8	"	" ......
" 15-16.	498	100.2	101.9	101.6	101.	....	101.	101.1+	101.9	"	" ......
" 22-23.	499	100.1	101.1	101.9	101.7	....	101.6	101.3—	101.9	"	10 p. m., 3 c.c., H. D., 10%....
" 22-23.	500	101.	101.4	101.7	101.6	....	101.6	101.3—	101.7	"	10 p. m., 5 c. c., H. D., 10%....
" 22-23.	501	101.2	101.6	102.	100.6	....	100.9	101.3—	102.	"	"
" 22-23.	502	100.8	101.	101.	101.3	....	101.4	101.1	101.4	"	"
" 22-23.	503	100.5	100.	100.7	100.4	....	100.7	100.5—	100.7	"	"
" 22-23.	504	101.	101.3	101.	101.5	....	101.2	101.2	101.5	"	"
" 22-23.	505	101.6	101.8	101.4	102.7	....	102.5	102.—	102.7	"	"
" 22-23.	506	101.7	101.4	102.	101.	....	101.1	101.4+	102.	"	"
" 22-23.	507	100.8	100.8	101.	101.4	....	101.5	101.1	101.5	"	"
" 22-23.	508	101.5	101.2	101.2	100.8	....	101.8	101.3	101.8	"	"
" 22-23.	509	101.1	100.6	101.5	100.1	....	101.4	101.1+	101.5	"	"
" 22-23.	510	101.	101.5	101.3	101.5	....	101.3	101.5+	101.5	"	10 p. m. 4.5 c. c., H. D., 10%....
" 22-23.	511	100.7	101.4	101.3	101.	....	101.	101.1+	101.4	"	"
Nov. 5-6..	512	102.4	102.4	101.7	100.9	101.4	....	101.7	102.4	"	10 p. m., 4. c. c......
" 5-6..	513	101.8	102.2	101.8	101.	100.9	....	101.5+	102.2	"	10 p. m., 5. c. c......
" 5-6..	514	102.	102.2	100.6	100.9	101.6	....	101.6—	102.2	"	10 p. m., 4. c. c......
" 5-6..	†515	101.7	101.8	101.	100.9	100.8	....	101.2—	101.8	"	" ......

TEMPERATURES. AFTER					Average.	Maximum.	Interval between injections and rise of temperature above maximum normal.	Duration of Rise.	Amount of Rise.	REMARKS.
11 a. m.	2 p. m.	5 p. m.	8 p. m.	11 p. m.						
							Hrs.	Hrs.	Deg.	
107.	104.6	105.	....	....	105.8	107.	10—	9+	4.5	Condemned ; mst. gl. ; liv. ; mm. lc.
105.5	105.7	104.5	....	....	104.7	105.7	8—	9+	3.6	Condemned ; mst. gl. ; lgs. ; liv. ; mm. lc.
101.8	102.	....	....	....	101.9+	102.	..	..	..	Negative.
105.2	106.1	106.4	....	....	105.5	106.4	8—	9—	3.9	Condemned ; liv. ; perit.
101.3	102.1	....	....	....	101.5	102.1	16—	..	.5	Negative.
101.2	101.8	....	....	....	101.1+	101.8	..	..	..	"
101.6	101.7	....	....	....	101.6	101.7	..	..	..	"
101.2	101.3	....	....	....	101.3—	101.3	..	..	..	"
101.6	102.	....	....	....	101.5+	102.	..	..	..	"
....	....	....	....	....	....	....	..	..	..	Not tested.
101.3	101.2	....	....	....	101.	101.3	..	..	..	Negative.
101.5	102.5	....	....	....	101.8	102.5	14—	..	.7	"
105.7	105.1	104.7	....	....	105.+	105.7	8—	9+	3.7	Condemned. ; mst. and br. gl. ; lgs. ; mm. lc.
105.5	104.9	106.2	....	....	105.3+	106.2	8—	9+	4.2	Condemned ; mst. and br. gl. ; lgs. ; Mm. lc.
101.7	103.7	....	....	....	102.+	103.7	14—	..	1.1	Negative.
102.4	102.	....	....	....	101.9—	102.4	..	..	..	"
107.6	104.7	105.1	....	....	106.1+	107.6	10—	..	3 5	Condemned ; mst. and br. gl. ; lgs.
105.5	105.2	....	....	....	105.+	105.5	8—	6+	3.5	Condemned ; mst. gl. ; liv.
104.8	103.3	....	....	....	103.6	104.8	8—	6+	2.6	Negative.
101.3	101.3	....	....	....	101.4+	101.7	..	..	..	"
106.4	105.2	105.3	....	....	105.3	106.4	8+	9+	4.4	Condemned ; mst. and br. gl. ; lgs. ; mm. ic.
101.3	101.4	....	....	....	101.2+	101.4	..	..	..	Negative.
102.	102.	....	....	....	102.	102.	..	..	..	"
101.6	101.5	....	....	....	106.7+	101.6	..	..	..	"
101.6	101.6	....	....	....	101.6—	101.8	..	..	..	"
104.8	104.4	105.7	....	....	104.7+	105.7	8—	9+	3.5	Condemned ; mst. gl. ; liv. : mm. lc. ; perit. lc.
101.8	103.2	104.8	....	....	102.7—	104.8	16—	3+	2.2	Negative ; all parts healthy.
101.5	102.2	....	....	....	101.5	102.2	14—	..	.2	Negative.
101.6	101.3	....	....	....	101.4+	101.6	..	..	..	"
105.6	104.2	104.5	....	....	105.3+	107.	10—	9+	4.7	Condemned ; mst. gl. ; Mm. lc.
101.1	101.2	103.6	....	....	101.8	103.6	19—	..	.4	Negative.
101.	101.7	101.2	....	....	101.2+	101.7	..	..	..	Negative ; all parts healthy.
101.1	100.5	....	....	....	100.2	101.1	..	..	..	Negative.
101.8	101.4	....	....	....	101.5+	101.8	..	..	..	"
104.6	106.4	105.9	....	....	104.9+	106.4	10—	9+	4.2	Condemned ; mst. and br. gl.
104.2	105.4	106.1	....	....	104.6	106.1	10—	9+	4.3	Condemned ; mst. gl. ; lgs. ; mm. lc.
105.7	105.8	104.6	....	....	105.4	105.8	10—	9+	3.9	Condemned ; mst. and br. gl. ; itl. lc. ; mm. lc.
101.7	101.6	....	....	....	101.6+	101.7	..	..	..	Negative.
102.1	101.5	....	....	....	101.7+	102.2	10—	3+	.5	"
101.3	100.5	....	....	....	100.9+	101.3	..	..	..	"
100.3	99.6	....	....	....	99.6+	100.3	..	..	..	"
100.2	101.2	...	....	....	100.8	101.2	10—	..	.5	"
101.9	101.5	....	....	....	101.1+	101.9	13—	..	.4	"
101.8	100.7	....	....	....	101.2	101.8	..	..	..	"
101.8	101.5	....	....	....	101.5—	101.8	..	..	..	"
101.8	101.4	....	....	....	101.5	101.8	13	..	.3	"
101.7	101.6	....	....	....	101.9	102.4	10—	..	.6	"
100.6	101.7	....	....	....	101.3	101.7	10—	..	.2	"
101.2	100.8	....	....	....	101+	101.2	..	..	..	"
102.4	100.	....	....	....	101.6	102.4	10—	3+	1.0	"
106.4	104.9	104.9	....	....	105.9+	107.2	10—	9+	4.8	Condemned ; mst. gl. ; lgs.
101.9	101.5	....	....	....	101.8—	101.9	..	..	..	Negative.
101.9	103.1	104.3	....	....	102.8—	104.3	16—	3+	2.1	"
105.9	102.7	101.9	....	....	103.8+	105.9	10—	9+	4.1	"

DATE.	TAG No.	TEMPERATURES.						Average.	Maximum.	TUBERCULIN INJECTION.	
		BEFORE.									
		8 a. m.	11 a. m.	2 p. m.	5 p. m.	8 p. m.	11 p. m.			Site.	Time, Amount, etc.
1896.											
Nov. 5-6..	†516	101.7	101.7	100.7	101.4	101.2	....	101.3	101.7	Neck....	10 p. m., 4. c. c......
" 5-6..	517	101.6	101.3	100.3	101.4	101.4	....	101.2	101.6	"	" ......
" 5-6..	518	101.8	101.6	100.4	101.7	101.1	....	101.3+	101.8	"	" ......
" 5-6..	519	102.7	102.8	101.	101.5	101.8	....	101.8—	102.8	"	" ......
" 5-6..	520	101.6	101.1	100.8	101.4	101.2	....	101.2+	101.6	"	" ......
" 5-6..	†521	102.6	102.8	101.	101.7	101.7	....	102.—	102.8	"	" ......
" 5-6..	522	101.8	101.7	101.2	101.7	101.8	....	101.6+	101.8	"	" ......
" 5-6..	†523	102.2	102.1	100.6	101.3	101.3	....	101.5+	102.2	"	" ......
" 5-6..	524	101.7	101.3	101.	101.2	101.2	....	101.3—	101.7	"	" ......
" 5-6..	525	102.	102.8	100.	100.9	101.2	....	101.4—	102.8	"	" ......
" 5-6..	†526	102.	101.3	100.3	101.5	101.4	....	101.3	102.	"	" ......
" 5-6..	527	101.6	101.1	100.9	100.6	100.7	....	101.+	101.6	"	" ......
" 5-6..	†528	101.4	101.7	101.	101.2	101.6	....	101.4—	101.7	"	" ......
" 5-6..	529	101.2	102.	101.4	101.5	101.1	....	101.4	102.	"	10 p. m., 3. c. c......
" 5-6..	530	101.4	102.	101.2	101.5	101.5	....	101.5+	102.	"	10 p. m., 4. c. c......
" 5-6..	531	101.3	101.2	101.5	102.9	103.	....	101.6—	103.	"	10 p. m., 1.25 c. c....
" 5-6..	532	101.3	101.3	101.9	102.	101.8	....	101.7	102.	"	10 p. m., 2.5 c. c....
" 5-6..	533	101.4	101.5	103.	104.4	104.9	....	103.+	104.9	"	10 p. m., 3. c. c......
" 5-6..	534	101.6	101.5	100.5	101.7	101.3	....	101.3+	101.7	"	10 p. m., 4. c. c......
" 5-6..	535	102.2	102.3	100.6	101.4	102.	....	101.7	102.3	"	" ......
" 5-6..	536	101.7	102.1	102.	101.3	101.7	....	101.8—	102.1	"	" ......
" 5-6..	537	102.2	102.1	101.6	101.9	101.5	....	101.8+	102.2	"	" ......
" 5-6..	†538	102.2	102.1	10 .7	101.6	101.5	....	101.6+	102.2	"	" ......
" 5-6..	539	101.8	101.1	100.6	101.8	101.8	....	101.4+	101.8	"	" ......
" 5-6..	540	102.	101.8	101.6	101.9	101.4	....	101.7+	102.	"	" ......
" 5-6..	†541	102.4	102.5	101.5	102.	101.9	....	102.1—	102.5	"	" ......
" 5-6..	542	101.8	101.6	100.4	101.2	101.3	....	101.2+	101.8	"	" ......
" 5-6..	543	102.	101.9	100.7	101.3	100.8	....	101.3+	102.	"	" ......
" 5-6..	544	102.4	102.1	100.2	100.8	101.7	....	101.4	102.4	"	" ......
" 5-6..	545	101.	101.1	100.8	101.5	101.3	....	101.1+	101.5	"	" ......
" 5-6..	546	102.	102.1	100.2	101.5	101.5	....	101.5—	102.	"	" ......
" 5-6..	†547	102.	102.1	100.6	101.4	101.3	....	101.5	102.1	"	" ......
" 5-6..	548	101.8	101.7	101.6	101.9	101.	....	101.6	101.9	"	10 p. m., 3. c. c......
" 5-6..	549	102.6	102.2	100.7	101.8	101.9	....	101.8+	102.6	"	10 p. m., 4. c. c......
" 5-6..	550	101.3	101.5	101.6	102.8	102.1	....	101.9—	102.8	"	10 p. m., 2.5 c. c...
" 5-6..	†551	102.4	101.9	100.8	101.3	101.7	....	101.1+	102.4	"	10 p. m., 4. c. c......
" 5-6..	552	100.6	101.4	101.4	102.	102.9	....	101.7	102.9	"	10 p. m., 1.25 c. c..
" 5-6..	553	100.4	100.4	101.5	101.6	101.3	....	101.+	101.6	"	10 p. m., 2. c. c......
" 5-6..	554	100.7	100.7	101.4	101.7	101.4	...	101.2—	101.7	"	" ......
" 5-6..	555	102.	102.	101.3	103.9	....	....	102.4+	103.9	"	10 p. m., 4. c. c......
" 5-6..	556	103.6	103.	104.	102.9	....	....	103.4—	104.	"	" ......
" 5-6..	557	101.5	101.6	101.6	101.2	....	....	101.5—	101.6	"	" ......
" 5-6..	558	101.4	102.6	103.	102.8	....	....	102.5—	103.	"	" ......
" 5-6..	559	101.5	100.8	100.3	101.3	....	....	101.—	101.5	"	" ......
" 5-6..	560	102.4	101.4	101.1	103.	....	....	102.—	103.	"	" ......
" 5-6..	561	102.3	101.6	101.5	101.7	....	....	101.8—	102.3	"	" ......
" 5-6..	562	103.	101.2	101.2	101.8	....	....	101.8	103.	"	" ......
" 5-6..	563	101.4	101.6	101.3	102.1	....	....	101.6	102.1	"	" ......
" 5-6..	564	102.	101.8	103.3	101.6	....	....	102.2	103.3	"	" ......
" 5-6..	565	104.6	104.8	104.2	105.	....	....	104.6+	105.	"	" ......
" 5-6..	566	102.3	101.4	101.2	100.3	....	....	101.3	102.3	"	" ......
" 5-6..	567	101.6	101.6	101.6	101.9	....	....	101.7—	101.9	"	" ......
" 5-6..	568	102.	101.8	101.3	101.5	....	....	101.6+	102.	"	" ......
" 5-6..	569	101.9	101.2	101.	101.3	....	....	101.3+	101.9	"	" ......
" 5-6..	570	102.	102.	101.	102.1	....	...	101.[illegible]—	102.1	"	" ......
" 5-6..	571	101.5	103.2	103.5	102.5	....	....	102.7—	103.5	"	" ......
" 5-6..	572	103.3	102.2	103.3	103.6	....	....	103.1	103.6	"	" ......
" 5-6..	573	104.	102.8	102.1	101.8	....	....	102.7	104.	"	" ......
" 9-10.	574	101.9	99.8	101.2	100.8	101.5	....	101.3	101.9	"	" ......

Temperatures.					Average.	Maximum.	Interval between injections and rise of temperature above maximum normal.	Duration of Rise.	Amount of Rise.	Remarks.
After										
11 a. m.	2 p. m.	5 p. m.	8 p. m.	11 p. m.						
							Hrs.	Hrs.	Deg.	
103.3	104.6	104.3	....	....	103.4+	104.6	13—	6+	2.9	Negative.
101.4	101.1	....	....	....	101.3—	101.4	..	..	..	"
102.9	103.3	102.3	....	....	102.2+	103.3	13—	6+	1.5	"
105.4	103.8	105.3	....	....	105.3+	106.9	10—	9+	4.1	Condemned; mst. gl.; lgs.; liv.
101.4	100.9	....	....	....	101.2+	101.4	..	..	..	Negative.
105.3	102.	101.6	....	....	103.6	105.5	10—	3+	2.7	"
105.5	104.	103.8	....	....	105+	106.9	10—	9+	5.1	Condemned; mst. gl.; lgs.
105.8	103.6	102.3	....	....	104—	105.8	10—	9+	3.6	Negative.
104.4	103.1	101.4	....	....	102.7+	104.4	10—	6+	2.7	"
101.6	101.1	....	....	....	101.4+	101.8	..	..	..	"
105.6	104.	102.5	....	....	104.3	105.6	10—	9+	3.6	"
100.7	100.8	....	....	....	101.—	101.4	..	..	..	"
104.5	103.1	104.4	....	....	104.—	104.5	10—	9+	2.8	"
103.9	103.5	103.6	....	....	103.4+	103.9	10—	9+	1.9	"
104.1	103.5	103.1	....	....	103.3+	104.1	10—	9+	2.1	"
101.	100.8	....	....	....	101.1	101.5	..	..	..	"
101.	101.	....	....	....	101.	101.	..	..	..	"
102.	102.3	....	....	....	102.1	102.3	..	..	..	"
101.5	101.4	....	....	....	101.5+	101.7	..	..	..	"
101.7	101.	....	....	....	101.4	101.7	..	..	..	"
106.2	103.	101.7	....	....	104.2—	106.2	10—	6+	4.1	Condemned; mst.; gl.
106.4	104.4	103.4	....	....	105.—	106.4	10—	9+	4.2	Condemned; mst. gl.; sbm. gl.; liv.; mes. gl.; mm. gl.
105.2	102.2	101.3	....	....	103.8	106.4	10—	3+	4.2	Negative.
103.6	103.6	105.7	....	....	104.8	106.3	10—	9+	4.5	Condemned; mm. gl.; mst. gl.; mes. gl.; lgs.; liv.; mm. gl.
103.2	102.8	102.5	....	....	102.7+	103.2	10—	9+	1.2	Negative.
104.9	103.	101.4	....	....	103.4+	104.9	10—	6+	2.4	"
104.1	104.4	104.7	....	....	104.6	105.2	10—	9+	3.4	Condemed; mst. gl.; lgs.; mes. gl.
101.7	101.	....	....	....	101.5+	101.9	..	..	..	Negative.
105.4	106.1	101.3	....	....	104.7+	106.1	10—	6+	3.7	Condemned; mst. gl.; lgs.; liv.; thor. and diaph.
104.6	104.3	104.4	....	....	105.5	106.8	10—	9+	5.3	Condemned; mst. gl.; lgs.; mm. gl.
101.4	101.7	....	....	....	101.5+	101.7	..	..	..	Negative.
105.3	104.3	104.4	....	....	104.4+	105.3	10—	9+	3.2	"
101.1	101.7	....	....	....	101.5	101.7	..	..	..	"
103.	101.2	100.9	....	....	102.6	103.	..	..	..	"
101.1	101.9	....	....	....	101.5	101.9	..	..	..	"
105.4	104.2	103.1	....	....	104.4	105.4	10—	9+	3.0	"
101.3	101.7	....	....	....	101.6—	101.7	..	..	..	"
102.3	102.1	....	....	....	102.1	102.3	10—	6+	.7	"
100.9	101.8	....	....	....	101.3+	101.8	..	..	..	"
99.2	100.7	....	....	....	99.9+	100.7	..	..	..	"
101.	101.9	....	....	....	101.5	101.9	..	..	..	"
101.5	101.4	....	....	....	101.+	101.5	..	..	..	"
101.5	102.5	....	....	....	101.9+	102.5	..	..	..	"
100.3	101.	....	....	....	100.5—	101.	..	..	..	"
100.4	100.4	....	....	....	100.3	100.4	..	..	..	"
100.7	101.8	....	....	....	101.2+	101.8	..	..	..	"
102.	101.7	....	....	....	101.9+	102.1	..	..	..	"
101.1	101.9	....	....	....	101.2—	101.9	..	..	..	"
101.4	101.2	....	....	....	100.9+	101.4	..	..	..	"
103.8	105.	....	....	....	103.6+	105.	..	..	..	"
100.4	101.5	....	....	....	100.3	101.5	..	..	..	"
101.	101.1	....	....	....	101.—	101.1	..	..	..	"
99.9	100.5	....	....	....	100.3+	100.6	..	..	..	"
101.4	101.3	....	....	....	101.4	101.5	..	..	..	"
100.5	101.2	....	....	....	101.1	101.6	..	..	..	"
102.1	102.1	....	....	....	101.9+	102.1	..	..	..	"
101.2	101.4	....	....	....	101.2	101.4	..	..	..	"
101.	101.3	....	....	....	101.3+	101.7	..	..	..	"
101.9	100.3	....	....	....	100.9—	101.9	..	..	..	"

DATE.	TAG No.	TEMPERATURES.						Average.	Maximum.	TUBERCULIN INJECTION.	
		BEFORE									
		8 a. m.	11 a. m.	2 p. m.	5 p. m.	8 p. m.	11 p. m.			Site.	Time, Amount, etc.
1896.											
Nov. 9-10.	575	101.4	100.9	100.5	101.1	100.9	....	100.9+	101.4	Neck....	10 p. m., 4 c. c......
" 9-10.	576	100.3	99.9	101.2	101.3	102.8	....	101.1	102.8	"	" ......
" 9-10.	577	101.	100.8	100.8	100.7	100.8	....	100.8+	101.	"	" ......
" 9-10.	578	101.5	100.8	100.8	100.	101.1	....	100.9—	101.5	"	" ......
" 9-10.	579	101.4	100.1	101.2	101.2	101.2	....	101.1—	101.4	"	10 p. m., 5 c. c......
" 9-10.	580	101.6	100.8	101.	101.3	100.9	....	101.1+	101.6	"	10 p. m., 4 c. c......
" 9-10.	581	101.5	100.7	101.1	100.5	101.	....	101.—	101.5	"	" ......
" 9-10.	582	101.4	100.8	101.	101.3	100.8	....	101.1—	101.4	"	" ......
" 9-10.	583	101.	100.6	101.1	103.1	100.6	....	100.9+	103.1	"	" ......
" 9-10.	584	102.8	104.9	104.9	104.5	105.2	....	104.5—	105.2	"	" ......
" 9-10.	585	103.3	101.7	101.2	100.6	100.4	....	101.4+	103.3	"	" ......
" 9-10.	586	101.9	100.9	100.2	100.5	101.9	....	100.9—	111.9	"	" ......
" 9-10.	587	101.2	100.9	100.8	101.2	101.5	....	100.9+	101.2	"	" ......
" 9-10.	588	101.2	100.9	101.	101.3	101.7	....	101.2+	101.7	"	" ......
" 9-10.	589	101.9	101.6	101.4	101.6	101.6	....	101.6+	101.9	"	" ......
" 9-10.	590	101.4	101.1	100.9	101.4	101.3	....	101.2+	101.4	"	" ......
" 9-10.	591	100.9	99.7	100.8	101.6	101.5	....	100.9	101.6	"	" ......
" 9-10.	592	100.5	101.1	100.9	100.8	100.9	....	100.8+	101.1	"	" ......
" 9-10.	593	100.6	101.2	103.4	102.3	102.5	....	102.	103.4	"	" ......
" 9-10.	594	100.8	101.	100.9	101.5	100.8	....	101.	101.5	"	" ......
" 9-10.	595	101.5	101.1	101.1	101.7	102.8	....	101.6+	102.8	"	" ......
" 9-10.	596	101.	100.9	100.9	100.7	101.4	....	101.—	101.4	"	" ......
" 9-10.	597	100.9	100.5	100.9	101.2	100.7	....	100.8+	101.2	"	" ......
" 11-12.	598	....	102.1	102.5	101.8	103.	....	102.3	102.3	"	" ......
" 11-12.	599	....	101.4	101.1	101.1	101.6	....	101.3	101.6	"	" ......
" 11-12.	600	....	100.3	100.7	101.	101.5	....	100.9	101.5	"	" ......
" 11-12.	601	....	101.8	101.7	101.2	102.4	...	101.8	102.4	"	" ......
" 11-12.	602	....	101.2	101.3	101.8	102.	....	101.6	102.0	"	" ......
" 11-12.	603	....	100.5	101.3	101.5	101.7	....	101.2+	101.7	"	10 p. m., 3½ c. c....
" 11-12.	604	....	101.3	101.4	100.6	101.7	....	101.2+	101.7	"	10 p. m., 4 c. c......
" 11-12.	605	....	100.6	101.7	101.5	101.3	....	101.3—	101.7	"	" ......
" 11-12.	606	....	101.3	101.1	102.3	101.7	....	101.6	102.3	"	10 p. m., 3½ c. c....
" 11-12.	607	....	101.8	101.2	101.1	101.	....	101.3	101.8	"	10 p. m., 4 c. c......
" 11-12.	608	....	101.8	101.4	100.8	101.	....	101.2+	101.8	"	" ......
" 11-12.	609	....	101.5	101.5	101.2	101.6	....	101.4+	101.6	"	" ......
" 11-12.	610	....	100.1	100.6	101.	101.4	....	100.8	101.4	"	" ......
" 11-12.	611	....	101.9	101.7	101.8	102.1	....	101.9	102.1	"	" ......
" 11-12.	612	....	99.4	101.2	101.2	102.	....	100.9+	102.	"	" ......
" 11-12.	†613	....	100.7	101.7	101.3	101.8	....	101.4—	101.8	"	" ......
" 11-12.	614	....	101.7	100.8	101.5	101.7	....	101.4+	101.7	"	" ......
" 11-12.	615	....	98.1	100.2	101.6	102.8	....	100.7	102.8	"	" ......
" 11-12.	616	....	101.5	101.2	101.6	102.2	....	101.7—	102.2	"	" ......
" 11-12.	617	....	102.9	103.4	104.2	103.	....	103.5	104.2	"	" ......
" 11-12.	618	....	102.2	101.7	102.6	102.6	....	103.0+	102.6	"	10 p. m., 3½ c. c....
" 11-12.	619	....	101.7	101.6	101.4	101.8	....	101.8+	101.8	"	10 p. m., 4 c. c......
" 11-12.	620	....	102.2	101.5	101.4	102.1	....	101.8	102.2	"	" ......
" 11-12.	621	....	101.8	101.7	101.1	101.4	....	101.5	101.8	"	" ......
" 11-12.	622	....	101.2	100.9	101.	101.2	....	101.1—	101.2	"	" ......
" 11-12.	623	....	101.8	101.6	101.4	101.6	....	101.5+	101.8	"	" ......
" 11-12.	624	....	101.3	101.5	100.9	101.4	....	101.3—	101.5	"	" ......
" 11-12.	625	....	104.5	101.2	99.8	101.3	....	101.—	101.4	"	" ......
" 11-12.	626	....	100.2	100.8	101.	101.1	....	101.+	101.1	"	" ......
" 11-12.	627	....	101.9	101.7	101.4	100.7	....	101.3—	101.9	"	" ......
" 11. 12.	628	102.2	101.4	101.7	101.8	....	....	101.8—	102.2	"	" ......
" 11-12.	629	101.7	101.5	101.3	101.7	....	....	101.5+	101.7	"	10 p. m., 3½ c. c....
" 11-12.	630	102.	101.1	101.5	101.4	....	....	101.5	102.	"	10 p. m., .4 c. c....
" 11-12.	631	101.3	101.	100.9	100.9	....	....	101.3—	101.3	"	" .....
" 11-12.	632	102.	101.6	101.6	102.	....	....	101.8	102.	"	" .....
" 11-12.	633	103.4	103.	102.4	102.9	....	....	102.9+	103.4	"	" .....
" 11-12.	634	101.7	101.4	101.4	101.5	....	....	101.5	101.7	"	" .....
" 11-12.	635	101.6	101.5	102.1	102.3	....	....	101.9—	102.3	"	" .....
" 11-12.	636	102.5	101.9	102.6	102.6	....	....	102.4	102.6	"	" .....
" 11-12.	637	100.5	101.8	102.	102.8	....	....	101.8—	102.8	"	" .....
" 11-12.	638	101.9	101.7	101.2	101.9	....	....	101.7—	101.9	"	" .....
" 11-12.	639	102.3	102.3	101.7	101.5	....	....	102.—	102.4	"	" .....
" 11-12.	640	102.1	102.	101.5	101.2	....	....	101.7—	102.1	"	" .....
" 11-12.	641	101.4	102.	102.3	101.2	....	....	101.7+	102.3	"	" .....

TEMPERATURES.										
	AFTER									
11 .m.	2 p. m.	5 p. m.	8 p. m.	11 p. m.	Average.	Maximum.	Interval between injections and rise of temperature above maximum normal.	Duration of Rise.	Amount of Rise.	REMARKS.
							Hrs.	Hrs.	Deg.	
00.7	101.2	....	....	....	101.1—	101.5	10	..	.1	Negative.
00.2	100.7	....	....	....	100.7—	101.1	..	..	..	"
01.1	100.9	....	....	....	101.2—	101.5	10	3+	.5	"
00.4	100.9	....	....	....	100.8	101.1	..	..	..	"
01.7	100.8	....	....	....	101.4	101.7	10	3+	.3	"
00.5	101.2	....	....	....	101.	101.3	..	..	..	"
01.	101.	....	....	....	100.9+	101.	..	..	..	"
01.1	101.2	....	....	....	101.3+	101.7	10	..	.3	"
00.9	100.9	....	....	....	101.+	101.3	..	..	..	"
04.3	103.7	....	....	....	103.8	104.3	..	..	..	"
00.7	100.6	....	....	....	100.7	100.8	..	..	..	"
00.5	100.9	....	....	....	100.9+	101.4	..	..	..	"
00.9	100.8	....	....	....	101.2—	101.8	10	..	.6	"
01.	101.3	....	....	....	101.1+	101.3	..	..	..	"
01.5	101.6	....	....	....	101.6+	101.8	..	..	..	"
00.4	100.9	....	....	....	100.9	101.4	..	..	..	"
00.3	100.7	....	....	....	100.4—	100.7	..	..	..	"
00.3	100.9	....	....	....	100.6+	100.9	..	..	..	"
01.5	100.7	....	....	....	101.	101.5	..	..	..	"
01.4	100.6	....	....	....	100.6+	101.4	..	..	..	"
00.1	101.1	....	....	....	100.9—	101.4	..	..	..	"
00.2	100.8	....	....	....	100.7—	101.	..	..	..	"
00.4	100.8	....	....	....	100.8+	101.3	10—	..	.1	"
02.2	102.7	....	....	....	102.2	102.7	16—	..	.4	"
00.5	100.7	....	....	....	101.+	101.9	10	..	.3	"
00.	100.7	....	....	....	100.5+	100.9	..	..	..	"
00.9	101.2	....	....	....	101.3	101.8	..	..	..	"
00.8	100.9	....	....	....	101.—	102.2	10—	..	.2	"
00.1	100.6	....	....	....	100.8+	101.8	10—	..	.1	"
00.7	101.1	....	....	....	101.3—	102.	10—	..	.3	"
00.3	101.4	....	....	....	101.3—	102.1	10—	..	.4	"
00.5	100.7	....	....	....	101.2+	102.5	10—	..	.2	"
01.5	100.9	....	....	....	101.6	102.4	10—	..	.6	"
00.2	101.8	....	....	....	101.5—	102.4	10—	..	.6	"
00.7	101.6	....	....	....	101.7—	102.7	10—	..	1.1	"
00.6	101.5	....	....	....	101.4+	102.2	10—	..	.8	"
01.4	102.1	....	....	....	102.1+	102.9	10—	..	.8	"
00.8	101.6	....	....	....	101.6—	102.3	10—	..	.3	"
04.4	104.6	....	....	....	104.6	104.8	10—	6+	.3	"
00.8	101.9	....	....	....	101.7	102.4	10—	..	.7	"
00.7	100.1	....	....	....	100.9	101.9	..	..	..	"
01.	101.2	....	....	....	100.7+	103.	10—	..	.8	"
00.6	101.2	....	....	....	101.4—	102.3	..	..	..	"
01.8	101.9	....	....	....	102.1—	102.5	..	..	..	"
01.3	101.2	....	....	....	101.6+	102.4	10—	..	.6	"
01.6	101.5	....	....	....	101.8	102.2	..	..	..	"
01.5	101.	....	....	....	101.6+	102.4	10—	..	.6	"
99.5	100.7	....	....	....	100.7	101.9	10—	..	.7	"
01.1	101.3	....	....	....	101.6—	102.3	10—	..	.5	"
00.9	100.9	....	....	....	101.3	102.1	10—	..	.6	"
00.4	100.	....	....	....	100.9—	102.2	10	..	.8	"
01.7	100.6	....	....	....	101.5	102.2	10	3+	1.1	"
01.1	101.	....	....	....	101.3	101.8	..	..	..	"
00.8	101.1	....	....	....	101.7—	102.	..	..	..	"
01.	101.	....	....	....	101.4+	102.3	10	..	.6	"
01.4	100.8	....	....	....	101.+	101.9	..	..	..	"
00.	99.8	....	....	....	100.5+	101.8	10	..	.5	"
01.3	101.4	....	....	....	101.7+	102.4	10	..	.4	"
02.5	102.8	....	....	....	103.	103.7	10	..	.3	"
01.6	101.6	....	....	....	101.7	101.9	10	..	.2	"
01.9	101.3	....	....	....	101.7+	102.	..	..	..	"
02.6	101.3	....	....	....	102.3—	102.9	10	3	3	"
01.7	100.3	....	....	....	101.6—	102.2	..	..	..	"
01.9	101.3	....	....	....	101.7—	101.9	..	..	..	"
01.9	101.7	....	....	....	101.8—	101.9	..	..	..	"
01.4	100.8	....	....	....	101.1	101.4	..	..	..	"
01.4	101.4	....	....	....	101.3	101.4	..	..	..	"

Date.	Tag No.	Temperatures. Before 8 a. m	11 a. m.	2 p. m.	5 p. m.	8 p. m.	11 p. m.	Average.	Maximum.	Tuberculin Injection. Site.	Time, Amount, etc.
1896.											
Nov. 11-12.	642	101.8	101.6	102.	100.2	...	....	101.4	102.	Neck....	10 p. m., .4 c.c.....
" 11-12.	643	101.6	101.6	101.7	100.5	....	....	101.3—	101.7	"	" .....
" 11-12.	644	101.9	101.9	102.2	100.6	.. .	....	101.6+	102.2	"	" .....
" 16-17.	645	100.3	100.9	101.1	100.9	100.6	....	100.8—	101.1	"	10 p. m., .5 c.c.....
" 16-17.	646	100.4	100.9	100.9	100.9	101.2	....	100.9—	101.2	"	" .....
" 16-17.	647	100.9	101.4	100.9	101.5	101.5	....	101.2+	101.5	"	" .....
" 16-17.	648	99.8	100.9	100.9	100.9	100.3	....	100.6—	100.9	"	" .....
" 19-17.	649	100.3	101.	101.	100.6	101.	....	100.8—	101.	"	" .....
" 16-17.	650	99.8	101.2	101.	101.1	101.8	....	101.	101.8	"	" .....
" 16-17.	651	100.5	101.1	100.9	100.8	102.4	....	101.5+	102.4	"	" .....
" 16-17.	652	101.3	100.9	101.3	100.9	101. .	....	101.—	101.3	"	" .....
" 16-17.	653	101.4	101.3	101.7	102.	102.1	....	101.7	102.1	"	" .....
" 16-17.	654	100.5	101.2	101.2	101.2	100.8	....	101.	101.2	"	" .....
" 16-17.	655	100.6	101.	100.	99.8	100.4	....	100.4	101.	"	" .....
" 16-17.	656	100.9	101.2	100.6	100.7	100.9	....	100.9	101.2	"	10 p. m., .4 c.c.....
" 16-17.	657	101.9	102.	101.2	101.3	101.	....	101.6	102.	"	" .....
" 16-17.	658	100.9	99.9	100.3	100.8	100.8	...	100.5+	100.9	"	" .....
" 16-17.	659	101.7	102.1	101.6	101.5	101.5	....	101.7	102.1	"	10 p. m., .5 c.c.....
" 16-17.	660	100.3	100.5	100.7	100.8	101.	....	100.7	101.	"	" .....
" 16-17.	661	100.7	101.5	101.3	101.6	101.3	....	101.3	101.6	"	10 p. m., .4 c.c.....
" 16-17.	662	101.1	101.3	100.8	101.1	100.5	....	101.2	101.5	"	10 p. m., .5 c.c.....
" 10-17.	663	100.7	100.7	101.	101.2	101.4	....	101.	101.4	"	" .....
" 16-17.	664	100.7	101.4	100.8	101.1	102.1	....	101.2	102.1	"	10 p. m., .4 c.c.....
" 16-17.	665	100.4	100.9	100.7	100.6	101.8	....	100.9—	101.8	"	" .....
" 19-20.	666	101.8	102.	102.2	101.8	....	....	102.	102.2	"	" .....
" 19-20.	667	101.9	102.8	102.	101.8	....	....	102.1+	102.8	"	" .....
" 19-20.	668	102.3	102.8	102.2	103.	....	....	102.1—	103.	"	" .....
" 19-20.	669	101.6	101.8	100.4	100.4	....	....	101.+	101.8	"	" .....
" 19-20.	670	100.7	102.	100.2	101.8	....	....	101.4+	102.	"	" .....
" 19-20.	671	101.5	102.	100.8	101.	....	....	101.3+	102.	"	" .....
" 19-20.	672	100.9	101.8	100.6	100.8	...	....	101.+	101.8	"	10 p. m., .5 c.c.....
" 19-20.	†673	101.7	102.	102.	101.2	....	....	101.7+	102.	"	10 p. m., .4 c.c.....
" 19-20.	674	101.6	102.	101.6	101.2	....	....	101.6	102.	"	" .....
" 19-20.	†675	101.1	102.	101.6	100.8	....	....	101.4+	102.	"	10 p. m., .5 c.c.....
" 19-20.	676	100.7	102.2	101.2	100.8	....	....	101.2+	102.2	"	10 p. m., .4 c.c.....
" 19-20.	677	101.	102.2	100.8	101.4	....	....	101.3+	102.2	"	10 p. m., .5 c.c.....
" 19-20.	678	101.9	102.	101.	100.4	....	....	101.3+	102.	"	" .....
" 19-20.	679	100.8	101.6	100.2	99.8	....	....	100.6	101.6	"	10 p. m., .4 c.c.....
" 19-20.	680	101.	101.6	100.4	101.	....	....	101.	101.6	"	" .....
" 19-20.	681	101.2	101.8	101.4	101.4	....	....	101.4+	101.8	"	" .....
" 19-20.	682	101.1	101.6	101.4	101.4	....	....	101.4—	101.6	"	" .....
" 19-20.	683	103.1	103.6	104.8	105.2	....	....	104.2—	105.2	"	" .....
" 19-20.	684	101.5	102.	101.4	101.4	....	....	101.6—	102.	"	" .....
" 19-20.	†685	101.4	102.6	101.8	102.2	....	....	102.	102.6	"	" .....
" 19-20.	686	102.4	102.	101.4	100.6	....	....	101.5	102.	"	" .....
" 19-20.	687	100.9	102.	100.6	100.4	....	....	101.—	102.	" ...	" .....
" 19-20.	688	101.4	100.6	101.4	100.8	....	....	101.+	101.4	"	10 p. m., .3 c.c.....
" 19-20.	689	101.2	100.6	100.4	100.8	....	....	100.7+	101.2	"	10 p. m., .4 c.c.....
" 19-20.	690	101.5	102.2	100.8	101.8	....	....	101.6—	102.2	"	" .....
" 19-20.	691	101.1	102.8	100.2	101.6	....	....	101.3—	102.8	"	" .....
" 19-20.	692	101.8	102.	102.4	101.8	....	....	102.	102.4	"	10 p. m., .5 c.c.....
" 19-20.	†693	100.6	100.6	101.	100.8	....	....	100.7+	101.	"	10 p. m., .4 c.c.....
" 19-20.	694	101.9	102.4	101.6	102.	....	....	102.—	102.4	"	" .....
" 19-20.	695	101.6	102.	101.2	101.4	....	....	101.5+	102.	"	" .....
" 19-20.	696	101.5	101.6	101.4	101.8	....	....	101.3+	101.6	"	" .....
" 19-20.	697	101.6	101.8	101.2	101.4	....	....	101.5	101.8	"	" .....
" 19-20.	698	101.4	101.8	101.8	101.	....	....	101.2+	101.8	"	" .....
" 19-20.	699	101.8	102.6	102.6	102.4	....	....	102.3+	102.6	"	" .....
" 19-20.	700	101.1	100.4	101.4	100.8	....	....	100.9+	101.4	"	" .....
" 23-24.	701	102.8	103.	103.2	....	102.1	....	102.8—	103.2	"	9.30 p. m., 5 c.c ...
" 23-24.	702	101.8	101.8	101.2	....	101.	....	101.4+	101.8	"	9.30 p. m., 3 c.c ...
" 23-24.	703	101.7	101.7	102.	....	101.5	....	101.7+	102.1	"	9.30 p. m., 4 c.c ...

TEMPERATURES.											
AFTER											
8 a.m.	11 a.m.	2 p.m.	5 p.m.	8 p.m.	11 p.m.	Average.	Maximum.	Interval between injections and rise of temperature above maximum normal.	Duration of Rise.	Amount of Rise.	REMARKS.
								Hrs.	Hrs.	Deg.	
100.9	100.9	101.1	....	....	....	101.	101.1	..	..	..	Negative.
101.5	100.9	100.9	....	....	....	101.1	101.5	..	..	..	"
101.1	101.3	102.2	....	....	....	101.5+	102.2	..	..	..	"
100.6	100.9	100.8	....	....	....	100.7+	100.9	..	..	..	"
100.8	100.9	100.7	....	....	....	100.8	100.9	..	..	..	"
101.	101.3	101.6	....	....	....	101.3	101.6	16	..	.1	"
100.4	101.4	101.4	....	....	....	100.9+	101.4	13	3+	.5	"
100.7	101.3	100.9	....	....	....	100.9+	101.3	13	..	.3	"
100.7	101.3	101.	....	....	....	101.	101.3	..	..	..	"
100.5	101.3	100.9	....	....	....	100.9	101.3	..	..	..	"
100.3	101.3	101.1	....	....	....	100.9	101.3	..	..	..	"
101.2	101.8	101.5	....	....	....	101.5	101.8	..	..	..	"
100.5	101.3	101.3	....	....	....	101.	101.3	13	3+	.1	"
99.6	100.6	100.1	....	....	....	100.1	100.6	..	..	..	"
100.6	100.8	100.8	....	....	....	100.7+	100.8	..	..	..	"
100.5	101.1	101.1	....	....	....	100.9	101.1	..	..	..	"
100.	100.6	101.1	....	....	....	100.5+	101.1	16	..	.2	"
101.3	100.9	101.4	....	....	....	101.2	101.4	..	..	..	"
100.2	100.8	100.7	....	....	....	101.5+	100.8	..	..	..	"
100.7	100.9	101.2	....	....	....	100.9	101.2	..	..	..	"
100.8	100.8	102.	....	....	....	101.2	102.	16	..	.5	"
100.5	101.1	100.7	....	....	....	100.7+	101.1	..	..	..	"
100.9	101.4	101.	....	....	....	101.1	101.4	..	..	..	"
101.4	101.	100.4	....	....	....	100.9+	101.4	..	..	..	"
101.	100.2	102.2	....	....	....	101.1+	102.2	..	..	..	"
103.	104.9	104.	104.	104.	....	104.2—	104.9	10	12	2.1	Condemned; mst. gl.; mes. gl.; lgs.; liv.; spl.; thor.
103.1	104.8	105.8	105.8	105.	....	104.9	105.8	10	12	2.8	Condemned; mst. gl.; mes. gl.; lgs.
100.6	101.6	100.	....	....	....	100.9—	101.6	..	..	..	Negative.
105.8	105.6	105.8	105.8	104.4	....	105.5—	105.8	10	12	3.8	Condemned; subm. gl.; mst. gl.; lgs.
100.	100.6	107.4	107.4	....	...	104.5	107.4	16	6+	5.4	Condemned; mst. gl.; mm. gl.
99.6	101.6	103.	102.8	....	....	101.8	103.	16	3+	1.2	Negative.
100.8	101.2	104.2	105.	....	....	102.8	105.	16	3+	3.0	"
100.8	102.2	102.2	....	....	....	101.7	102.2	13	3+	.2	"
102.6	104.6	103.4	103.4	....	....	103.5	104.6	10	9+	2.6	"
100.6	101.4	101.6	....	....	....	101.2	101.6	..	..	..	"
103.2	105.2	105.2	104.4	103.8	....	104.4	105.2	10	12+	3.0	Condemned; mst. gl.; lgs.; thor.
101.	102.4	102.2	....	....	....	101.9	102.4	13	3+	.4	Negative.
100.6	102.	101.4	....	....	....	101.3+	102.	13	..	.4	"
100.6	101.8	100.6	....	....	....	101.	101.8	13	..	.2	"
101.3	101.6	102.6	....	....	....	101.8+	102.6	16	..	.8	"
101.4	104.7	105.4	103.8	103.2	....	103.7	105.4	13	9+	3.8	Condemned; mst. gl.
103.2	103.2	104.	....	....	....	103.5	104.	..	..	..	Negative.
100.4	100.8	102.8	....	....	....	101.3+	102.8	16	..	.8	"
104.	105.6	104.2	104.2	....	....	104.5	105.6	10	9+	3.0	"
101.2	102.	100.8	....	....	....	101.3+	102.	..	..	..	"
99.6	101.6	101.6	....	....	....	100.9+	101.6	..	..	..	"
100.8	101.4	102.	....	....	....	101.4	102.	16	..	.6	"
100.6	101.	101.	....	....	....	100.9—	101.	..	..	..	"
100.2	100.6	102.4	....	....	....	101.1	102.4	16	..	.2	"
100.8	102.4	103.	....	....	....	102.1—	103.	16	..	.2	"
101.5	102.4	103.2	....	....	....	102.4—	103.2	16	..	.8	"
101.	101.8	103.8	104.3	....	....	102.7+	104.3	13	6+	3.3	"
101.	102.	102.2	....	....	....	101.6	102.2	..	..	..	"
101.	101.8	102.	....	....	....	101.2	102.	..	..	..	"
102.	101.8	101.8	....	....	....	101.9—	102.	10	6	.4	"
101.	101.6	102.2	....	....	....	101.6	102.2	16	..	.4	"
104.	105.8	105.8	105.2	103.5	....	104.9	105.8	10	12+	.4	Condemned; mst. gl.; lgs.
100.8	102.8	102.9	....	....	....	102.2	102.9	13	3+	.3	Negative.
100.4	102.9	102.4	....	....	....	101.7	102.4	13	3+	.1	"
102.4	102.9	101.3	....	....	....	102.2	102.9	..	..	..	"
101.5	102.6	102.	....	....	....	102.1—	102.6	13½—	3+	.9	"
101.9	101.7	101.8	....	....	....	101.8	101.9	..	..	..	"

DATE.	TAG No.	TEMPERATURES.						Average.	Maximum.	TUBERCULIN INJECTION.	
		BEFORE									
		8 a. m.	11 a. m.	2 p. m.	5 p. m.	8 p. m.	11 p. m.			Site.	Time, Amount, etc.
1896. Nov. 23-24.	704	101.7	101.6	101.2	....	101.5	....	101.5	101.7	Neck....	9.30 p. m., 3 c. c ...
" 23-24.	705	102.6	102.5	101.5	....	102.	....	102.1+	102.6	"	9.30 p. m., 4 c. c ...
" 23-24.	706	100.	100.	99.	....	101.3	....	100.1—	101.3	"	" ...
" 23-24.	707	101.9	101.4	100.	....	101.4	....	101.2—	101.9	"	" ...
" 23-24.	708	101.8	101.1	100.9	....	102.	....	101.4+	102.	"	" ...
" 23-24.	709	101.1	101.8	100.9	....	101.2	....	101.2+	101.8	"	9.30 p. m., 5 c. c ...
" 23-24.	710	100.7	100.	99.2	....	100.2	....	100.+	100.7	"	" ...
" 23-24.	711	101.1	100.9	99.5	....	101.5	....	100.7+	101.5	"	9.30 p. m., 4 c. c ...
" 23-24.	712	100.	101.	99.3	....	101.2	....	100.4—	101.2	"	" ...
" 23-24.	713	101.8	101.4	101.4	....	101.2	....	101.4+	101.8	"	" ...
" 23-24.	714	100.	100.7	98.4	....	100.2	....	99.8+	100.7	"	" ...
" 23-24.	715	101.	101.4	100.5	....	100.8	....	100.9+	100.8	"	9.30 p. m., 5 c. c ...
" 23-24.	716	101.8	102.2	100.7	....	101.	....	101.4+	102.2	"	" ...
" 23-24.	717	101.2	101.	100.	....	101.3	....	100.9—	101.3	"	" ...
" 23-24.	718	101.[illegible]	102.2	101.1	....	101.3	....	101.6—	102.2	"	" ...
" 23-24.	719	101.8	102.2	102.4	....	102.4	....	102.2	102.4	"	9.30 p. m., 2.5 c. c..
" 23-24.	720	102.2	101.5	100.9	....	101.4	....	101.5	102.2	"	" ..
		8 a. m.	11 a. m.	4 p. m.	10 p. m.						
" 27-28.	721	101.8	101.8	100.6	101.	....	....	101.3+	101.8	....	10 p. m., 3 c. c......
" 27-28.	722	101.7	101.8	101.9	99.2	....	....	101.2+	101.9	....	" ......
" 27-28.	723	101.3	101.6	101.4	100.	....	....	101.1—	101.6	....	" ......
" 27-28.	724	102.3	102.2	101.2	101.	....	....	101.7—	102.3	....	" ......
" 27-28.	725	101.3	100.1	101.3	100.5	....	....	100.8	101.3	....	" ......
" 27-28	†726	101.8	101.4	101.3	99.7	....	....	101.+	101.8	....	" ......
" 27-28.	727	101.1	101.3	100.9	99.8	....	....	100.8—	101.3	....	10 p. m., 4 c. c......
" 27-28.	728	100.3	101.4	100.9	98.5	....	....	100.3—	101.4	....	10 p. m., 3 c. c......
" 27-28.	729	100.8	101.4	101.	100.	....	....	100.8	101.4	....	10 p. m., 3.5 c. c ...
" 27-28.	†730	103.3	104.2	103.2	101.8	....	....	103.1+	104.2	....	....
" 27-28.	731	100.3	101.6	101.3	100.1	....	....	100.8+	101.6	....	10 p. m., 3 c. c......
" 27-28.	732	101.3	101.2	101.	100.2	....	....	100.9+	101.3	....	" ......
" 27-28.	733	101.4	101.1	101.4	98.4	....	....	100.6—	101.4	....	" ......
" 27-28.	734	100.4	101.5	101.4	100.4	....	....	100.9+	101.5	....	10 p. m., 5 c. c......
" 27-28.	735	101.7	102.	102.1	100.8	....	....	101.6+	102.1	....	" ......
" 27-28.	736	101.6	101.3	101.3	100.4	....	....	101.1+	101.6	....	10 p. m., 4 c. c......
" 27-28.	†737	101.6	101.2	100.	100.3	....	....	100.8	101.6	....	" ......
" 27-28.	738	102.2	102.4	101.8	100.4	....	....	101.7	102.4	....	" ......
" 27-28.	739	101.3	101.2	100.8	100.9	....	....	101.+	101.3	....	" ......
" 27-28.	740	101.	101.	100.8	100.5	....	....	100.8+	101.	....	10 p. m., 5 c. c......
" 27-28.	741	101.6	101.8	101.2	101.8	....	....	101.6	101.8	....	10 p. m., 4 c. c......
" 27-28.	742	102.1	101.7	101.4	100.5	....	....	101.4+	102.1	....	" ......
" 27-28.	743	101.2	101.2	103.7	100.6	....	....	101.7—	103.7	....	" ......
" 27-28.	744	101.	101.	101.	100.5	....	....	100.9—	101.	....	10 p. m., 3 c. c......
" 27-28.	745	101.7	101.6	101.8	100.4	....	....	101.4—	101.8	....	10 p. m., 4 c. c .....
" 27-28.	746	100.7	101.4	101.	100.5	....	....	100.9	101.	....	" ......
" 27-28.	747	100.8	100.2	100.5	100.3	....	....	100.4+	100.8	....	" ......
" 27-28.	748	101.5	101.4	100.8	100.4	....	....	101.+	101.5	....	" ......
" 27-28.	749	101.	101.6	101.2	100.4	....	....	101.+	101.6	....	" ......
" 27-28.	750	101.7	100.2	101.2	101.4	....	....	101.1+	101.7	....	" ......
" 27-28.	751	101.4	101.5	101.6	100.9	....	....	101.3+	101.6	....	" ......
" 27-28.	752	101.3	101.4	100.	100.5	....	....	100.8	101.4	....	10 p. m., 5 c. c......
		8 a. m.	11 a. m.	2 p. m.	5 p. m.	8 p. m.	11 p. m.				
" 27-28.	753	102.	102.6	102.	100.1	....	....	101.8+	102.6	....	10 p. m., 4 c. c......
" 27-28.	754	102.	101.6	102.	101.6	....	....	101.8	102.	....	10 p. m., 3 c. c ....
Dec. 1....	755	101.7	101.	102.	101.5	....	....	101.5+	101.7	....	10 p. m., 4 c. c......
" 1	756	101.5	101.2	101.8	100.8	....	....	101.3+	101.8	....	" ......
" 1....	757	101.	101.2	100.6	101.3	....	....	101.+	101.3	....	" ......
" 1....	758	102.4	100.5	99.	99.4	....	....	100.3+	102.4	....	" ......
" 1....	759	101.5	100.5	102.	100.6	....	....	101.1+	102.	....	" ......
" [illegible]....	760	100.5	100.	100.4	99.1	....	....	100.	100.5	....	" ......
[illegible]	761	100.7	100.5	101.	99.1	....	....	100.3+	101.	....	" ......
[illegible]	762	101.5	101.	101.5	101.1	....	....	101.3—	101.5	....	" ......
[illegible]	763	101.9	101.4	101.5	101.2	....	....	101.5	101.9	....	" ......
[illegible]	764	101.3	101.5	101.2	100.5	....	....	101.1+	101.5	....	" ......

Temperatures.											
After											
8 a. m.	11 a. m.	2 p. m.	5 p. m.	8 p. m.	11 p. m.	Average.	Maximum.	Interval between injections and rise of temperature above maximum normal.	Duration of Rise.	Amount to Rise.	Remarks.
								Hrs.	Hrs.	Deg.	
102.6	101.8	101.8	....	....	....	102.1—	102.6	10½—	6+	.9	Negative.
102.6	102.3	101.5	....	....	....	102.1+	102.6	..	..	..	"
101.5	101.5	101.5	....	....	....	101.5	101.5	10½—	6+	.2	"
102.2	101.7	102.	....	....	....	102.—	102.2	10½—	..	.3	"
101.5	102.	101.4	....	....	....	101.6+	102.	..	..	..	"
101.4	101.3	101.5	....	....	....	101.4	101.5	..	..	..	"
100.8	100.9	101.5	....	....	....	101.1—	101.5	10½—	6+	.8	"
101.6	100.8	100.4	....	....	....	100.9+	101.6	10½—	..	.1	"
101.2	101.4	101.3	....	....	....	101.3	101.4	13½—	3+	.2	"
101.5	101.3	101.1	....	....	....	101.3	101.5	..	..	..	"
101.4	101.2	100.4	....	....	....	101.	101.4	10½—	3+	.7	"
101.4	101.4	102.1	....	....	....	101.6+	102.1	10½—	6+	1.3	"
101.6	101.4	101.8	....	....	....	101.6	101.8	..	..	..	"
101.6	102.2	99.8	....	....	....	101.2	102.2	10½—	3+	.9	"
101.6	101.6	101.7	....	....	....	101.6+	101.7	..	..	..	"
102.3	102.2	102.1	....	....	....	102.2	102.3	..	..	..	"
101.4	101.5	101.4	....	....	....	101.4+	101.5	..	..	..	"
101.1	101.5	102.1	....	....	....	101.6	102.1	16—	..	.3	"
106.4	105.3	106.	105.2	....	....	105.6	106.4	10—	9+	4.5	Condemned; lgs.; mst. gl.
101.	100.7	101.	....	....	....	100.9	101.	..	..	..	Negative.
101.5	100.	101.2	....	....	....	100.9	101.5	..	..	..	"
99.	101.	101.	....	....	....	100.3+	101.	..	..	..	"
100.8	101.7	104.4	103.6	....	....	102.6+	104.4	16—	3+	2.6	"
100.6	100.	100.4	....	....	....	100.3+	100.5	..	..	..	"
101.6	101.5	99.5	....	....	....	100.9—	101.6	10—	3+	.2	"
101.2	101.2	101.5	....	....	....	101.3	101.5	16—	..	.1	"
....	....	....	....	....	....	....	....	..	..	..	Not tested.
100.1	100.	100.7	....	....	....	100.3—	100.7	..	..	..	"
100.8	100.8	100.8	....	....	....	100.8	100.8	..	..	..	"
100.7	101.3	101.2	....	....	....	101.1—	101.3	..	..	..	"
99.5	100.9	101.	....	....	....	100.5—	101.6	..	..	..	"
100.7	101.	101.5	....	....	....	101.1—	101.5	..	..	..	"
101.3	100.8	99.9	....	....	....	100.7—	101.3	..	..	..	Negative.
102.1	102.4	104.3	103.6	....	....	103.1	104.3	10—	9+	2.7	"
102.7	103.9	105.7	105.2	....	....	104.4—	105.7	10—	9+	3.3	Condemned; mst. gl.; pl.; lgs.
105.1	106.5	105.5	105.2	....	....	105.6—	106.5	10—	9+	5.2	Condemned; lgs.; mst. gl.
101.	100.5	101.4	....	....	....	101.—	101.4	16—	..	4	Negative.
101.5	101.4	101.4	....	....	....	101.4+	101.5	..	..	..	"
101.6	101.2	100.6	....	....	....	101.1+	101.6	..	..	..	"
101.8	101.8	105.7	105.2	....	....	103.6+	105.7	16—	3+	2.	"
101.9	101.6	101.5	....	....	....	101.7—	101.9	10—	6+	.9	"
100.9	101.	101.	....	....	....	101.—	101.	..	..	..	"
101.	103.3	101.	....	....	....	101.1	101.3	13—	..	.3	"
102.4	103.5	105.2	103.4	....	....	103.6+	105.2	10—	9+	4.4	Condemned; lgs.; mst. gl.
100.2	104.4	104.7	....	....	....	103.3+	104.7	13—	3+	3.2	Condemned; mst. gl.; mm.; lc.
101.	100.9	101.	....	....	....	101.—	101.	..	..	..	Negative.
106.5	105.7	105.3	104.4	....	....	105.5	106.5	10—	9+	4.8	Condemned; mst. gl.; mm.; lc.
101.2	101.	101.4	....	....	....	101.2	101.4	..	..	..	Negative.
100.8	100.7	100.8	....	....	....	100.8—	100.8	..	..	..	"
102.	101.1	100.7	....	....	....	101.3—	102.	..	..	..	"
101.2	101.	101.	....	....	....	101.1—	101.2	..	..	..	"
101.4	100.9	100.8	....	....	....	101.+	101.4	..	..	..	"
101.4	101.6	100.4	....	....	....	101.1+	101.6	..	..	..	"
101.4	101.5	102.1	....	....	....	101.7—	102.1	10—	6+	.8	"
101.8	100.8	99.6	....	....	....	100.7+	101.8	..	..	..	"
105.	106.1	106.	....	....	....	105.7	106.1	10—	6+	4.1	Condemned; mst. gl.; liv.; lgs.; mm. gl.
100.5	100.7	101.	....	....	....	104.1—	101.	13—	3+	.5	Negative.
100.2	100.2	98.8	....	....	....	99.7+	100.2	..	..	..	"
101.	99.5	100.1	....	....	....	100.2	101.	..	..	..	"
101.3	101.5	101.6	....	....	....	101.5—	101.6	..	..	..	"
100.5	99.	100.3	....	....	....	99.9+	100.5	..	..	..	"

Date.	Tag No.	Temperatures.						Average.	Maximum.	Tuberculin Injection.	
		before									
		8 a.m.	11 a.m.	2 p.m.	5 p.m.	8 p.m.	11 p.m.			Site.	Time, Amount, etc.
1896.											
Dec. 1	765	101.2	100.5	100.8	100.5	....	....	100.7+	101.2	Neck	10 p.m., 4 c.c
" 1	766	101.8	100.6	101.3	99.6	....	....	100.8+	101.8	"	"
" 1	767	100.6	100.5	99.	99.5	....	....	99.9	100.6	"	10 p.m., 5 c.c.
" 1	768	102.2	101.8	102.	100.8	....	....	101.7	102.2	"	10 p.m., 4 c.c.
" 1	769	101.6	100.7	100.8	100.5	....	....	100.9	101.6	"	"
" 1	770	101.6	101.2	101.	100.8	....	....	101.1+	101.6	"	"
" 1	771	100.2	101.	101.4	100.4	....	....	100.7+	101.4	"	10 p.m., 5 c.c.
" 1	772	101.	100.6	100.6	100.	....	....	100.5+	101.	"	10 p.m., 4 c.c.
" 1	773	101.8	101.	101.5	101.	....	....	101.3+	101.8	"	"
" 1	774	101.8	101.1	100.6	98.8	....	....	100.6—	101.8	"	"
" 1	775	101.8	101.3	101.4	100.8	....	....	101.3+	101.8	"	"
" 1	776	100.8	100.6	100.9	100.8	....	....	100.8—	100.9	"	"
" 1	777	101.5	101.2	100.4	101.	....	....	101.+	101.5	"	"
" 1	778	101.2	101.5	101.	100.8	....	....	101.1+	101.5	"	"
" 1	779	101.8	101.3	101.2	99.5	....	....	100.9+	101.8	"	"
" 3-4	780	101.4	101.	101.2	99.6	....	....	100.8	101.4	"	"
" 3-4	781	100.	101.2	100.1	100.4	....	....	100.4+	101.2	"	"
" 3-4	782	102.2	101.	101.4	99.3	....	....	101.—	102.2	"	"
" 3-4	783	100.7	100.8	100.	98.6	....	....	100.+	100.8	"	10 p.m., 5 c.c.
" 3-4	784	100.5	101.5	101.8	99.5	....	....	100.8+	101.8	"	10 p.m., 4 c.c
" 3-4	785	101.6	101.6	101.9	100.6	....	....	101.6+	101.9	"	10 p.m., 5 c.c.
" 3-4	786	102.5	102.	100.3	100.8	....	....	101.4	102.5	"	10 p.m., 3 c.c.
" 3-4	787	101.	101.9	101.2	100.4	....	....	101.1+	101.9	"	10 p.m., 4 c.c.
" 3-4	788	101.5	101.6	100.7	100.4	....	....	101.+	101.6	"	10 p.m., 3 c.c.
" 3-4	789	100.8	101.5	100.5	100.0	....	....	100.7	101.5	"	10 p.m., 4 c.c.
" 3-4	790	101.3	101.6	101.	100.6	....	....	101.1+	101.6	"	"
" 3-7	791	100.3	101.	100.6	99.	....	....	100.2+	101.	"	"
" 3-4	792	101.	101.	101.4	100.1	....	....	100.9	101.4	"	10 p.m., 5 c.c.
" 3-4	793	101.8	102.4	101.8	100.5	....	....	101.6+	102.4	"	10 p.m., 4 c.c.
" 3-4	794	101.	101.5	101.	101.0	....	....	101.1+	101.5	"	"
" 3-4	795	99.	102.	100.4	99.5	....	....	100.2+	102.	"	"
" 3-4	796	101.6	101.2	101.3	100.	....	....	101.+	101.6	"	"
" 3-4	797	100.5	101.2	100.5	100.2	....	....	100.6	101.2	"	"
" 3-4	798	100.7	101.3	101.7	99.	....	....	100.7	101.7	"	"
" 3-4	799	101.	101.7	101.3	110.4	....	....	101.1	101.7	"	"
Nov. 24-25	8-1	101.6	101.4	101.4	101.	101.2	....	101.3+	101.6	"	"
" 24-25	802	101.4	101.	101.2	101.	101.	...	101.1+	101.4	"	10 p.m., 5 c.c.
" 24-25	803	101.4	101.	100.	101.	101.	....	100.9—	101.4	"	10 p.m., 4 c.c.
" 24-25	804	101.0	101.	101.	101.	101.	....	101.	101.	"	"
" 24-25	805	101.4	101.4	102.	101.6	101.	....	101.5—	102.	"	"
" 24-25	806	101.4	101.2	102.	101.	101.4	....	101.4	102.	"	"
" 24-25	807	101.4	101.4	101.	101.2	101.6	....	101.3+	101.6	"	"
" 24-25	808	101.6	101.4	101.	101.2	101.2	....	101.5—	101.6	"	"
" 24-25	809	101.6	101.4	101.	101.2	101.2	...	101.5—	102.1	"	"
" 24-25	810	101.	101.	101.	101.	102.	....	101.+	101.4	"	"
" 24-25	811	101.4	101.4	101.	101.4	101.	....	101.2+	101.2	"	"
" 24-25	812	100.6	101.	100.	101.	101.2	....	100.8—	101.2	"	"
" 24-25	813	101.	101.	101.	101.	101.2	....	101.+	101.6	"	10 p.m., 5 c.c.
" 24-25	814	101.4	101.4	102.	101.2	101.	....	101.4	102.	"	"
" 24-25	815	101.	101.4	101.2	101.	101.2	....	101.2—	101.4	"	10 p.m., 4 c.c.
" 24-25	816	101.4	101.4	101.0	101.6	102.	....	101.6	102.	"	10 p.m., 5 c.c.
" 24-25	817	101.	101.2	100.4	101.	101.	....	100.9+	101.2	"	"
" 24-25	818	101.2	102.	101.6	101.	102.	....	101.6—	102.	"	"
" 24-25	819	101.6	101.2	101.4	101.	100.	....	101.+	101.6	"	10 p.m., 4 c.c.
" 24-25	820	101.4	101.4	101.	101.4	101.6	....	101.3+	101.6	"	"
" 24-25	821	101.6	101.	101.6	101.4	101.6	....	101.4+	101.6	"	10 p.m., 5 c.c.
" 24-25	822	101.4	101.	100.	102.	101.	....	101.+	102.	"	10 p.m., 4 c.c.
" 24-25	823	100.	100.2	101.	101.4	101.2	....	100.8+	101.4	"	"
" 24-25	824	101.	100.6	101.4	101.4	101.	....	101.3—	101.4	"	"
" 24-25	†825	100.6	101.	100.	100.4	101.	....	100.5	101.	"	"

TEMPERATURES.					Average.	Maximum.	Interval between injections and rise of temperature above maximum normal.	Duration of Rise.	Amount of Rise.	REMARKS.
	AFTER									
1.	2 p. m.	5 p. m.	8 p. m.	11 p. m.			Hrs.	Hrs.	Deg.	
8	100.1	....	....	....	100.1+	100.5	..	..	..	Negative.
4	100.3	....	....	....	100.6—	101.	..	..	..	"
3	101.3	....	....	....	100.2	101.3	16—	..	.7	"
7	100.4	....	....	....	101.1	101.7	..	..	..	"
8	100.8	....	....	....	101.1+	101.8	10—	..	.2	"
	101.4	....	....	...	101.4	101.8	10—	..	.2	"
8	102.2	....	....	....	101.3+	102.2	13—	3+	.8	"
	101.2	....	....	....	100.8—	101.2	10—	..	.2	"
8	100.6	....	....	....	100.9—	101.2	..	..	..	"
	100.2	....	....	....	100.—	100.2	..	..	..	"
3	101.7	....	....	....	101.3	101.7	..	..	..	"
8	101.5	....	....	....	101.+	101.5	16—	..	.6	"
7	100.5	....	....	....	100.7—	100.8	..	..	..	"
9	101.	....	....	....	101.1	101.4	..	..	..	"
	101.	....	....	....	100.4+	101.	..	..	..	"
	100.8	102.3	....	....	101.5+	102.3	13—	..	.7	"
8	102.6	103.	....	....	102.6+	103.	10—	9+	1.8	"
6	105.2	105.4	....	....	104.—	105.4	13—	6+	3.2	Condemned; mst. gl.
1	102.8	102.5	....	....	101.8+	102.8	13—	6+	2.	Negative.
4	105.2	106.	....	....	104.7—	106.	10—	9+	3.2	Condemned; mst. gl.; lgs.
	103.4	103.6	....	....	102.5+	103.6	13—	6+	1.7	Negative.
4	105.4	106.6	....	....	104.9+	106.6	13—	6+	4.1	Condemned; perit.; mst. gl.
6	105.2	103.8	....	....	104.5+	105.6	10—	19+	3.7	Condemned; mst. gl.; pl; lgs.
7	104.8	105.2	....	....	105.4+	106.1	10—	19+	4.5	Condemned; mst. gl.; lgs.
2	101.6	100.5	....	....	100.9	101.6	6	..	.1	Negative.
	101.	101.5	....	....	101.1+	101.5	..	..	..	"
	104.6	105.9	....	....	105.5+	106.	10—	19+	5.	Condemned; mst. gl.; lgs.
	103.8	103.8	....	....	105.2+	107.3	10—	19+	5.9	Condemned; lgs.; liv.
	102.4	102.4	...	....	101.8—	102.4	..	..	..	Negative.
5	103.	104.5	....	....	101.9—	104.5	16—	3+	.6	"
9	106.1	106.	....	....	104.9—	106.1	10—	19+	4.2	Condemned; br. gl.; l. lg.
2	102.8	103.8	....	....	102.3	103.8	13—	6+	2.2	Negative.
3	103.4	105.	....	....	105.5	106.3	10—	19—	5.1	Condemned; mst. gl.
3	102.7	104.	....	....	102.8+	104.	13—	6+	2.3	Negative.
5	101.8	101.5	....	....	101.6+	101.8	16—	..	.1	"
5	105.2	....	....	....	101.3+	106.5	10—	16+	4.9	Condemned; thor.; abd.; mst. gl.; lgs.; liv.; spl.
8	101.9	....	....	....	101.1+	102.8	10—	16+	1.4	Negative.
	103.	....	....	....	100.9—	103.	10—	16+	1.6	"
1	102.	....	....	....	101.	102.1	10—	16+	1.1	"
8	103.1	....	....	....	101.5—	103.1	16—	..	1.1	"
9	101.2	....	....	....	101.4	101.9	..	..	..	"
8	105.3	....	....	....	101.3+	105.8	10—	16+	3.8	Condemned; lgs.; mst. gl.; liv.
4	103.5	....	....	....	101.3—	103.5	10—	16+	1.9	Negative.
9	103.7	....	....	....	101.2	103.7	13—	3+	1.7	"
	105.1	103.9	....	....	101.2+	105.1	10—	19	3.7	Condemned; lgs.; mst.; liv
4	101.4	....	....	....	100.8	101.4	10—	16	.2	Negative.
6	102.5	....	....	....	101.+	102.6	10—	16	1.4	"
9	103.9	104.	....	....	101.1+	106.4	10—	19	4.8	Condemned; liv.; lgs., mst. gl.; mes. gl.
6	103.2	102.5	....	....	101.4	106.6	10—	19	4.6	Condemned; lgs.; mst. gl.; mes. gl.; liv.
9	103.4	....	....	....	101.2	103.4	13—	6—	2.	Negative.
5	104.	104.	....	....	101.6	105.	10—	19	3.5	Condemned; l. lg., mst. gl.; mes. gl.
8	104.6	....	....	....	101.9	107.4	10—	16	6.2	Condemned; l. lg.; mst. gl.
4	101.8	....	....	....	101.6	102.4	12+	..	.4	Negative.
	100.5	....	....	....	101.+	101.2	..	..	..	"
5	103.5	....	....	....	101.4	106.5	10—	6+	4.9	Condemned; lgs.; mst. gl.; liv.
7	104.	105.5	....	....	101.4	106.7	10—	9+	5.1	Condemned; lgs.; mst. gl.
6	100.8	....	....	....	101.2	101.6	..	..	..	Negative.
	103.3	....	....	....	100.8—	104.	10—	6+	2.6	"
4	103.6	103.3	....	....	101.1	105.4	10—	9+	4.	Condemned; mst. gl.
2	103.7	....	....	....	100.6	103.7	10—	6+	2.7	Negative.

Date.	Tag No.	Temperatures. before 8 a. m.	11 a. m.	2 p. m.	5 p. m.	8 p. m.	11 p. m.	Average.	Maximum.	Tuberculin Injection. Site.	Time, Amount, etc.
1896. Nov. 24–25.	826	101.4	100.2	102.	101.2	101.	....	101.2—	102.	Neck....	10 p. m., 4 c. c .....
" 24–25.	827	101.6	100.4	102.	101.4	100.	....	101.1—	102.	"	" .....
" 24–25.	828	100.6	101.4	101.	100.2	100.2	....	100.7—	101.4	"	" ....
" 24–25.	829	100.6	100.4	101.	101.	101.	....	100.8	101.	"	10 p. m., 4½ c. c....
" 24–25.	830	101.1	101.1	102.	101.	101.	....	101.2+	102.	"	" ....
" 27–28.	831	101.	101.4	101.4	101.4	101.6	....	101.4—	101.6	"	" ....
" 27–28.	832	101.2	100.7	101.4	101.	100.2	....	100.9	101.4	"	" ....
" 27–28.	833	102.2	101.4	100.6	102.	101.4	....	101.5+	102.2	"	" ....
" 27–28.	*834	101.4	101.	102.	101.2	101.6	....	101.4+	101.6	"	" ....
" 27–28.	835	101.	101.4	101.4	102.2	101.2	....	101.4+	102.2	"	" ....
" 27–28.	836	101.	101.7	102.2	101.4	100.6	....	101.4—	102.2	"	" ....
" 27–28.	*837	101.2	101.2	101.6	102.	101.	....	101.4	102.	"	" ....
" 27–28.	838	100.4	101.1	100.6	101.2	100.4	....	100.7	101.2	"	" ....
" 27–28.	839	102.	101.6	102.	102.2	101.	....	101.8—	102.2	"	" ....
" 27–28.	840	101.6	100.9	101.	101.6	100.2	...	101.+	101.6	"	" ....
" 27–28.	841	102.4	102.4	102.2	103.2	102.4	....	102.5+	103.2	"	" ....
" 27–28.	842	101.	100.8	101.2	101.2	100.	....	100.8+	101.2	"	" ....
" 27–28.	†843	101.4	101.5	101.2	102.	101.	....	101.4	101.5	"	" ....
" 27–28.	844	101.6	101.6	102.	101.6	101.	....	101.6—	102.	"	" ....
" 27–28.	*845	101.6	101.5	101.4	102.	101.	....	101.5	102.	"	" ....
" 27–28.	846	101.2	100.6	101.2	101.6	100.4	....	101.	101.2	"	" ....
" 27–28.	847	101.2	101.2	101.4	101.	101.	....	101.1+	101.4	"	" ....
" 27–28.	848	101.6	100.7	100.4	101.6	100.2	....	100.9	101.6	"	" ....
" 27–28.	849	101.6	101.5	101.2	102.	101.4	....	101.5+	102.	"	" ....
" 27–28.	850	101.4	101.	101.4	101.4	102.	....	101.4+	102.	"	" ....
" 27–28.	851	102.	101.7	102.	102.	102.2	....	101.9+	102.2	"	" ....
" 27–28.	852	101.	101.	101.2	101.	100.2	....	100.9—	101.2	"	" ....
" 27–28.	853	101.	101.4	101.4	101.	101.2	....	101.2	101.4	"	" ....
" 27–18.	*854	103.	102.7	103.	102.6	102.4	....	102.7	103.	"	" ....
" 27–28.	*855	102.	102.	103.	103.2	103.8	....	102.8	103.8	"	" ....
" 27–28.	856	101.4	101.9	102.4	102.2	101.	....	101.8—	102.4	"	" ....
" 27–18.	857	101.4	101.7	102.	102.	102.	....	101-8+	102.	"	" ....
" 27–28.	858	101.	101.	101.4	101.2	101.2	....	101.2—	101.4	"	" ....
" 27–28.	859	101.2	101.5	101.4	101.4	101.	....	101.3	101.5	"	" ....
Dec. 1–2...	860	101.6	100.	101.1	101.	93.	....	100.7	101.6	"	" ....
" 1–2...	861	101.3	101.	101.	101.	100.	....	100.9	101.3	"	10 a.m., 4 c.c., No. 6.
" 1–2...	862	102.	100.5	101.5	101.2	100.	....	101.1+	102.	"	"
" 1–2...	863	101.5	101.8	101.7	101.6	100.4	....	101.4	101.8	"	"
" 1–2...	864	101.6	101.5	102.2	102.4	100.8	....	101.7	102.4	" . .	"
" 1–2...	865	101.7	101.1	101.2	101.	100.2	....	101.	101.7	"	"
" 1–2...	866	100.8	100.	101.2	100.4	100.6	....	100.6	101.2	"	"
" 1–2...	867	100.1	99.5	100.7	100.4	98.	....	99.7+	100.7	"	"
" 1–2...	868	101.2	100.9	101.4	101.2	100.4	....	101.+	101.4	"	"
" 1–2...	869	99.	100.7	100.2	100.6	98.2	....	100.1	100.7	"	"
" 1–2...	870	100.5	100.6	101.	101.	99.8	....	100.6	101.	"	"
" 1–2...	871	101.4	101.6	101.8	101.2	100.2	....	101.2+	101.8	"	"
" 1–2...	872	102.	101.2	101.7	101.4	101.	....	101.5	102.	"	"
" 1–2...	873	101.2	101.2	101.2	101.2	100.6	....	101.1	101.2	"	"
" 1–2...	874	101.	101.5	101.7	101.8	100.	....	101.2	101.8	"	"
" 1–2...	875	101.6	101.	101.	101.6	101.	....	101.2	101.6	"	"
" 1–2...	876	99.	101.1	100.7	101.	99.	....	100.2	101.1	"	"
" 1–2...	877	101.	101.2	101.2	101.	98.2	....	100.5	101.2	"	"
" 1–2...	878	101.	101.6	101.3	100.2	100.	....	100.8	101.6	"	"
" 1–2...	879	101.	101.8	101.9	101.6	100.	....	101.3	101.9	"	10 a. m., 3 c. c......
" 1–2...	880	99.	100.2	101.3	101.	99.2	....	100.1	101.3	"	10 a. m., 4 c. c......
" 1–2...	881	100.	101.5	100.6	101.	99.4	....	100.5	101.5	"	" .....
" 1–2...	882	100.4	101.5	102.3	102.4	100.	....	101.3	102.4	"	" .....
" 1–2...	883	101.	101.7	101.6	101.	100.2	....	101.1	101.7	"	" .....
" 1–2...	884	101.2	100.6	101.8	101.	101.	....	101.1	101.8	"	" .....
" 1–2...	885	100.2	101.1	101.2	101.	100.4	....	100.6	101.2	"	" .....
" 1–2...	886	99.	101.5	101.4	101.	99.	....	100.4	101.5	"	" .....
" 1–2...	887	100.2	101.5	101.6	102.	102.	....	101.5	102.	"	10 p. m., 3 c. c......
" 1–2...	883	101.	101.4	101.8	101.4	101.6	....	101.4+	101.8	"	10 p. m., 4 c. c......

TEMPERATURES.										
AFTER										
a.	2 p.m.	5 p.m.	8 p.m.	11 p.m.	Average.	Maximum.	Interval between injections and rise of temperature above maximum normal.	Duration of Rise.	Amount of Rise.	REMARKS.
							Hrs.	Hrs.	Deg.	
.7	102.2	....	....	....	101.2	102.2	15+	..	.2	Negative.
.4	105.6	105.1	....	....	101.3	106.4	10—	9+	4.4	Condemned; l. lgs.; mst. gl.; liv.
.5	103.	104.4	....	....	100.7	106.6	10—	9+	5.2	Condemned; lgs.; mst. gl.
.6	103.9	103.	....	....	100.8	105.7	10—	9+	4.7	Condemned; lgs.; mst. gl.
.6	104.	102.5	....	....	101.4	106.6	10—	9+	4.6	Condemned; lgs.; mst. gl.; mes. gl.
.2	102.	....	....	....	101.1+	101.2	..	..	..	Negative.
.4	100.6	....	....	....	101.	101.4	..	..	..	“
.2	101.6	....	....	....	101.1+	101.6	..	..	..	“
.	101.	....	....	....	101.	102.	12+	..	.4	Negative; all parts healthy.
.	101.2	....	....	....	99.2+	101.2	..	..	..	Negative.
.6	102.6	....	....	....	102.8+	104.6	10—	6+	2.6	“
.4	103.6	....	....	....	103.8+	104.4	10—	6+	2.4	Negative; all parts healthy.
.2	101.	....	....	....	100.8+	101.2	..	..	..	Negative.
.	101.	....	....	....	100.8	101.	..	..	..	“
.	100.	....	....	....	100.	100.	..	..	..	“
.2	104.2	102.6+	....	....	103.3+	104.2	12+	6+	1.	“
.6	101.2	....	....	....	100.2+	101.2	..	..	..	“
.	103.2	104.	....	....	103.4	105.	12+	6+	3.5	“
.	101.2	....	....	....	101.2	102.	..	..	..	“
.2	102.	....	....	....	101.6	102.	..	..	..	Negative; all parts healthy.
.2	100.	....	....	....	100.+	101.2	..	..	..	Negative.
.2	103.	102.6	....	....	104.1	105.6	10—	9+	4.2	Condemned; mst. gl.; liv.
.2	102.2	....	....	....	100.8+	102.2	15+	..	.6	Negative.
.	101.4	....	....	....	101.	101.4	..	..	..	“
.	103.4	....	....	....	102.7—	104	12+	3+	.2	“
.2	101.4	....	....	....	101.5+	101.4	..	..	..	“
.	100.6	....	....	....	100.6+	101.	..	..	..	“
.	101.2	....	....	....	101.+	101.2	..	..	..	“
.6	102.2	....	....	....	102.2+	102.6	..	..	..	Negative; all parts healthy.
.2	102.2	....	....	....	102.2+	102.2	..	..	..	“ “
.2	106.6	107.	....	....	106.7	107.2	10—	9+	4.8	Condemned; mst. gl.; liv.
.4	102.	....	....	....	101.8	102.	..	..	..	Negative.
.6	100.	....	....	....	100.+	100.6	..	..	..	“
.4	100.	....	....	....	100.8	101.4	..	..	..	“
.1	101.2	....	....	....	101.2+	101.4	..	..	..	“
.1	101.2	....	....	....	101.3—	101.5	10—	..	.2	“
.1	101.2	....	....	....	101.3	101.5	..	..	..	“
.4	100.9	....	....	....	100.5	100.9	..	..	..	“
.4	101.9	....	....	....	101.2	101.9	..	..	..	“
.8	101.2	....	....	....	100.9	101.2	..	..	..	“
.2	100.4	....	....	....	99.9	100.4	..	..	..	“
.5	99.9	....	....	....	99.3	99.9	..	..	..	“
.3	100.4	....	....	....	100.9	101.3	..	..	..	“
.	100.2	....	....	....	100.	100.2	..	..	..	“
.3	105.9	....	....	....	105.5	106.3	10—	6—	5.3	Condemned; l. lg.; mst. gl.; liv.: omt.; s. int.; abd. cav.
.9	100.8	....	....	....	100.8	100.9	..	..	..	Negative.
.2	101.9	....	....	....	101.3	101.9	..	..	..	“
.5	101.5	....	....	....	101.1	101.5	12+	3+	.3	“
.	100.7	....	....	....	100.8+	101.	..	..	..	“
.6	101.	....	....	....	101.2	101.6	..	..	..	“
.	99.9	....	....	....	99.7	100.	..	..	..	“
.5	100.7	....	....	....	100.3	100.7	..	..	..	“
.	101.2	....	....	....	100.7	101.2	..	..	.4	“
.4	102.	....	....	....	101.3	102.	15+	..	.1	“
.3	101.	....	....	....	101.3	101.5	10—	..	.2	“
.6	102.7	....	....	....	102.3	102.7	12+	3+	1.2	“
.3	102.4	....	....	....	102.3	102.4	..	..	..	“
.5	101.1	....	....	....	100.9	101.1	..	..	..	Negative.
.6	101.3	....	....	....	101.5	101.6	..	..	..	“
.4	101.1	....	....	....	100.6	101.1	..	..	..	“
.6	100.4	....	....	....	100.3	100.6	..	..	..	“
.4	101.2	....	....	....	101.5	102.	..	..	..	“
.4	101.9	....	....	....	101.7	101.9	16—	3—	.1	“

Date.	Tag No.	Temperatures.								Tuberculin Injection.	
		Before									
		8 a. m.	11 a. m.	2 p. m.	5 p. m.	8 p. m.	11 p. m.	Average.	Maximum.	Site.	Time, Amount, etc.
1896.											
Nov. 9-10.	575	101.4	100.9	100.5	101.1	100.9	....	100.9+	101.4	Neck....	10 p.m., 4 c.c......
“ 9-10.	576	100.3	99.9	101.2	101.3	102.8	....	101.1	102.8	“	“ ......
“ 9-10.	577	101.	100.8	100.8	100.7	100.8	....	100.8+	101.	“	“ ......
“ 9-10.	578	101.5	100.8	100.8	100.	101.1	....	100.9—	101.5	“	“ ......
“ 9-10.	579	101.4	100.1	101.2	101.2	101.2	....	101.1—	101.4	“	10 p.m., 5 c.c......
“ 9-10.	580	101.6	100.8	101.	101.3	100.9	....	101.1+	101.6	“	10 p.m., 4 c.c......
“ 9-10.	581	101.5	100.7	101.1	100.5	101.	....	101.—	101.5	“	“ ......
“ 9-10.	582	101.4	100.8	101.	101.3	100.8	....	101.1—	101.4	“	“ ......
“ 9-10.	583	101.	100.6	101.1	103.1	100.6	....	100.9+	103.1	“	“ ......
“ 9-10.	584	102.8	104.9	104.9	104.5	105.2	....	104.5—	105.2	“	“ ......
“ 9-10.	585	103.3	101.7	101.2	100.6	100.4	....	101.4+	103.3	“	“ ......
“ 9-10.	586	101.9	100.9	100.2	100.5	101.9	....	100.9—	111.9	“	“ ......
“ 9-10.	587	101.2	100.9	100.8	101.2	101.5	....	100.9+	101.2	“	“ ......
“ 9-10.	588	101.2	100.9	101.	101.3	101.7	....	101.2+	101.7	“	“ ......
“ 9-10.	589	101.9	101.6	101.4	101.6	101.6	....	101.6+	101.9	“	“ ......
“ 9-10.	570	101.4	101.1	100.9	101.4	101.3	....	101.2+	101.4	“	“ ......
“ 9-10.	591	100.9	99.7	100.8	101.6	101.5	....	100.9	101.6	“	“ ......
“ 9-10.	592	100.5	101.1	100.9	100.8	100.9	....	100.8+	101.1	“	“ ......
“ 9-10.	593	100.6	101.2	103.4	102.3	102.5	....	102.	103.4	“	“ ......
“ 9-10.	594	100.8	101.	100.9	101.5	100.8	....	101.	101.5	“	“ ......
“ 9-10.	595	101.5	101.1	101.1	101.7	102.8	....	101.6+	102.8	“	“ ......
“ 9-10.	596	101.	100.9	100.9	100.7	101.4	....	101.—	101.4	“	“ ......
“ 9-10.	597	100.9	100.5	100.9	101.2	100.7	....	100.8+	101.2	“	“ ......
“ 11-12.	598	....	102.1	102.5	101.8	103.	....	102.3	102.3	“	“ ......
“ 11-12.	599	....	101.4	101.1	101.1	101.6	....	101.3	101.6	“	“ ......
“ 11-12.	600	....	100.3	100.7	101.	101.5	....	100.9	101.5	“	“ ......
“ 11-12.	601	....	101.8	101.7	101.2	102.4	...	101.8	102.4	“	“ ......
“ 11-12.	602	....	101.2	101.3	101.8	102.	....	101.6	102.0	“	“ ......
“ 11-12.	603	....	100.5	101.3	101.5	101.7	....	101.2+	101.7	“	10 p.m., 3½ c.c....
“ 11-12.	604	....	101.3	101.4	100.6	101.7	....	101.2+	101.7	“	10 p.m., 4 c.c......
“ 11-12.	605	....	102.6	101.7	101.5	101.3	....	101.3—	101.7	“	“ ......
“ 11-12.	606	....	101.3	101.1	102.3	101.7	....	101.6	102.3	“	10 p.m., 3½ c.c....
“ 11-12.	607	....	101.8	101.2	101.1	101.	....	101.3	101.8	“	10 p.m., 4 c.c......
“ 11-12.	608	....	101.8	101.4	100.8	101.	....	101.2+	101.8	“	“ ......
“ 11-12.	609	....	101.5	101.5	101.2	101.6	....	101.4+	101.6	“	“ ......
“ 11-12.	610	....	100.1	100.6	101.	101.4	....	100.8	101.4	“	“ ......
“ 11-12.	611	....	101.9	101.7	101.8	102.1	....	101.9	102.1	“	“ ......
“ 11-12.	612	....	99.4	101.2	101.2	102.	....	100.9+	102.	“	“ ......
“ 11-12.	†613	....	100.7	101.7	101.3	101.8	....	101.4—	101.8	“	“ ......
“ 11-12.	614	....	101.7	100.8	101.5	101.7	....	101.4+	101.7	“	“ ......
“ 11-12.	615	....	98.1	100.2	101.6	102.8	....	100.7	102.8	“	“ ......
“ 11-12.	616	....	101.5	101.2	101.6	102.2	....	101.7—	102.2	“	“ ......
“ 11-12.	617	....	102.9	103.4	104.2	103.	....	103.5	104.2	“	“ ......
“ 11-12.	618	....	102.2	101.7	102.6	102.6	....	103.0+	102.6	“	10 p.m., 3½ c.c....
“ 11-12.	619	....	101.7	101.6	101.4	101.8	....	101.8+	101.8	“	10 p.m., 4 c.c......
“ 11-12.	620	....	102.2	101.5	101.4	102.1	....	101.8	102.2	“	“ ......
“ 11-12.	621	....	101.8	101.7	101.1	101.4	....	101.5	101.8	“	“ ......
“ 11-12.	622	....	101.2	100.9	101.	101.2	....	101.1—	101.2	“	“ ......
“ 11-12.	623	....	101.8	101.6	101.4	101.6	....	101.5+	101.8	“	“ ......
“ 11-12.	624	....	101.3	101.5	100.9	101.4	....	101.3—	101.5	“	“ ......
“ 11-12.	625	....	104.5	101.2	99.8	101.3	....	101.—	101.4	“	“ ......
“ 11-12.	626	....	100.2	100.8	101.	101.1	....	101.+	101.1	“	“ ......
“ 11-12.	627	....	101.9	101.7	101.4	100.7	....	101.3—	101.9	“	“ ......
“ 11. 12.	628	102.2	101.4	101.7	101.8	....	....	101.8—	102.2	“	“ ......
“ 11-12.	629	101.7	101.5	101.3	101.7	....	....	101.5+	101.7	“	10 p.m., 3½ c.c....
“ 11-12.	630	102.	101.1	101.5	101.4	....	....	101.5	102.	“	10 p.m., .4 c.c.....
“ 11-12.	631	101.3	101.	100.9	100.9	....	....	101.3—	101.3	“	“ .....
“ 11-12.	632	102.	101.6	101.6	102.	....	....	101.8	102.	“	“ .....
“ 11-12.	633	103.4	103.	102.4	102.9	....	....	102.9+	103.4	“	“ .....
“ 11-12.	634	101.7	101.4	101.4	101.5	....	....	101.5	101.7	“	“ .....
“ 11-12.	635	101.6	101.5	102.1	102.3	....	....	101.9—	102.3	“	“ .....
“ 11-12.	636	102.5	101.9	102.6	102.6	....	....	102.4	102.6	“	“ .....
“ 11-12.	637	100.5	101.8	102.	102.8	....	....	101.8—	102.8	“	“ .....
“ 11-12.	638	101.9	101.7	101.2	101.9	....	....	101.7—	101.9	“	“ .....
“ 11-12.	639	102.3	102.3	101.7	101.5	....	....	102.—	102.4	“	“ .....
“ 11-12.	640	102.1	102.	101.5	101.2	....	....	101.7—	102.1	“	“ .....
“ 11-12.	641	101.4	102.	102.3	101.2	....	....	101.7+	102.3	“	“ .....

Temperatures.									
After									
2 p. m.	5 p. m.	8 p. m.	11 p. m.	Average.	Maximum.	Interval between injections and rise of temperature above maximum normal.	Duration of Rise.	Amount of Rise.	Remarks.
						Hrs.	Hrs.	Deg.	
101.2	....	....	....	101.1—	101.5	10	..	.1	Negative.
100.7	....	....	....	100.7—	101.1	..	..	..	"
100.9	....	....	....	101.2—	101.5	10	3+	.5	"
100.9	....	....	....	100.8	101.1	..	..	..	"
100.8	....	....	....	101.4	101.7	10	3+	.3	"
101.2	....	....	....	101.	101.3	..	..	..	"
101.	....	....	....	100.9+	101.	..	..	..	"
101.2	....	....	....	101.3+	101.7	10	..	.3	"
100.9	....	....	....	101.+	101.3	..	..	..	"
103.7	....	....	....	103.8	104.3	..	..	..	"
100.6	....	....	....	100.7	100.8	..	..	..	"
100.9	....	....	....	100.9+	101.4	..	..	..	"
100.8	....	....	....	101.2—	101.8	10	..	.6	"
101.3	....	....	....	101.1+	101.3	..	..	..	"
101.6	....	....	....	101.6+	101.8	..	..	..	"
100.9	....	....	....	100.9	101.4	..	..	..	"
100.7	....	....	....	100.4—	100.7	..	..	..	"
100.9	....	....	....	100.6+	100.9	..	..	..	"
100.7	....	....	....	101.	101.5	..	..	..	"
100.6	....	....	....	100.6+	101.4	..	..	..	"
101.1	....	....	....	100.9—	101.4	..	..	..	"
100.8	....	....	....	100.7—	101.	..	..	..	"
100.8	....	....	....	100.8+	101.3	10—	..	.1	"
102.7	....	....	....	102.2	102.7	16—	..	.4	"
100.7	....	....	....	101.+	101.9	10	..	.3	"
100.7	....	....	....	100.5+	100.9	..	..	..	"
101.2	....	....	....	101.3	101.8	..	..	..	"
100.9	....	....	....	101.—	102.2	10—	..	.2	"
100.6	....	....	....	100.8+	101.8	10—	..	.1	"
101.1	....	....	....	101.3—	102.	10—	..	.3	"
101.4	....	....	....	101.3—	102.1	10—	..	.4	"
100.7	....	....	....	101.2+	102.5	10—	..	.2	"
100.9	....	....	....	101.6	102.4	10—	..	.6	"
101.8	....	....	....	101.5—	102.4	10—	..	.6	"
101.6	....	....	....	101.7—	102.7	10—	..	1.1	"
101.5	....	....	....	101.4+	102.2	10—	..	.8	"
102.1	....	....	....	102.1+	102.9	10—	..	.8	"
101.6	....	....	....	101.6—	102.3	10—	..	.3	"
104.6	....	....	....	104.6	104.8	10—	6+	.3	"
101.9	....	....	....	101.7	102.4	10—	..	.7	"
100.1	....	....	....	100.9	101.9	..	..	..	"
101.2	....	....	....	100.7+	103.	10—	..	.8	"
101.2	....	....	....	101.4—	102.3	..	..	..	"
101.9	....	....	....	102.1—	102.5	..	..	..	"
101.2	....	....	....	101.6+	102.4	10—	..	.6	"
101.5	....	....	....	101.8	102.2	..	..	..	"
101.	....	....	....	101.6+	102.4	10—	..	.6	"
100.7	....	....	....	100.7	101.9	10—	..	.7	"
101.3	....	....	....	101.6—	102.3	10—	..	.5	"
100.9	....	....	....	101.3	102.1	10—	..	.6	"
100.	....	....	....	100.9—	102.2	10	..	.8	"
100.6	....	....	....	101.5	102.2	10	3+	1.1	"
101.	....	....	....	101.3	101.8	..	..	..	"
101.1	....	....	....	101.7—	102.	..	..	..	"
101.	....	....	....	101.4+	102.3	10	..	.6	"
100.8	....	....	....	101.+	101.9	..	..	..	"
99.8	....	....	....	100.5+	101.8	10	..	.5	"
101.4	....	....	....	101.7+	102.4	10	..	.4	"
102.8	....	....	....	103.	103.7	10	..	.3	"
101.6	....	....	....	101.7	101.9	10	..	.2	"
101.3	....	....	....	101.7+	102.	..	..	..	"
101.3	....	....	....	102.3—	102.9	10	3	3	"
100.3	....	....	....	101.6—	102.2	..	..	..	"
101.3	....	....	....	101.7—	101.9	..	..	..	"
101.7	....	....	....	101.8—	101.9	..	..	..	"
100.8	....	....	....	101.1	101.4	..	..	..	"
101.4	....	....	....	101.3	101.4	..	..	..	"

DATE.	TAG No.	TEMPERATURES.								TUBERCULIN INJECTION.	
		BEFORE						Average.	Maximum.		
		8 a. m	11 a. m.	2 p. m.	5 p. m.	8 p. m.	11 p. m.			Site.	Time, Amount, etc.
1896.											
Nov. 11–12.	642	101.8	101.6	102.	100.2	...	....	101.4	102.	Neck....	10 p. m., .4 c.c.....
“ 11–12.	643	101.6	101.6	101.7	100.5	....	....	101.3—	101.7	“	“ .....
“ 11–12.	644	101.9	101.9	102.2	100.6	.. .	....	101.6+	102.2	“	“ .....
“ 16–17.	645	100.3	100.9	101.1	100.9	100.6	....	100.8—	101.1	“	10 p. m., .5 c.c.....
“ 16–17.	646	100.4	100.9	100.9	100.9	101.2	....	100.9—	101.2	“	“ .....
“ 16–17.	647	100.9	101.4	100.9	101.5	101.5	....	101.2+	101.5	“	“ .....
“ 16–17.	648	99.8	100.9	100.9	100.9	100.3	....	100.6—	100.9	“	“ .....
“ 19–17.	649	100.3	101.	101.	100.6	101.	....	100.8—	101.	“	“ .....
“ 16–17.	650	99.8	101.2	101.	101.1	101.8	....	101.	101.8	“	“ .....
“ 16–17.	651	100.5	101.1	100.9	100.8	102.4	....	101.5+	102.4	“	“ .....
“ 16–17.	652	101.3	100.9	101.3	100.9	101.	....	101.—	101.3	“	“ .....
“ 16–17.	653	101.4	101.3	101.7	102.	102.1	....	101.7	102.1	“	“ .....
“ 16–17.	654	100.5	101.2	101.2	101.2	100.8	....	101.	101.2	“	“ .....
“ 16–17.	655	100.6	101.	100.	99.8	100.4	....	100.4	101.	“	“ .....
“ 16–17.	656	100.9	101.2	100.6	100.7	100.9	....	100.9	101.2	“	10 p. m., .4 c.c.....
“ 16–17.	657	101.9	102.	101.2	101.3	101.	....	101.6	102.	“	“ .....
“ 16–17.	658	100.9	99.9	100.3	100.8	100.8	...	100.5+	100.9	“	“ .....
“ 16–17.	659	101.7	102.1	101.6	101.5	101.5	....	101.7	102.1	“	10 p. m., .5 c.c.....
“ 16–17.	660	100.3	100.5	100.7	100.8	101.	....	100.7	101.	“	“ .....
“ 16–17.	661	100.7	101.5	101.3	101.6	101.3	....	101.3	101.6	“	10 p. m., .4 c.c.....
“ 16–17.	662	101.1	101.3	100.8	101.1	100.5	....	101.2	101.5	“	10 p. m., .5 c.c.....
“ 10–17.	663	100.7	100.7	101.	101.2	101.4	....	101.	101.4	“	“ .....
“ 16–17.	664	100.7	101.4	100.8	101.1	102.1	....	101.2	102.1	“	10 p. m., .4 c.c.....
“ 16–17.	665	100.4	100.9	100.7	100.6	101.8	....	100.9—	101.8	“	“ .....
“ 19–20.	666	101.8	102.	102.2	101.8	....	....	102.	102.2	“	“ .....
“ 19–20.	667	101.9	102.8	102.	101.8	....	....	102.1+	102.8	“	“ .....
“ 19–20.	668	102.3	102.8	102.2	103.	....	....	102.1—	103.	“	“ .....
“ 19–20.	669	101.6	101.8	100.4	100.4	....	....	101.+	101.8	“	“ .....
“ 19–20.	670	100.7	102.	100.2	101.8	....	....	101.4+	102.	“	“ .....
“ 19–20.	671	101.5	102.	100.8	101.	....	....	101.3+	102.	“	“ .....
“ 19–20.	672	100.9	101.8	100.6	100.8	...	....	101.+	101.8	“	10 p. m., .5 c.c.....
“ 19–20.	†673	101.7	102.	102.	101.2	....	....	101.7+	102.	“	10 p. m., .4 c.c.....
“ 19–20.	674	101.6	102.	101.6	101.2	....	....	101.6	102.	“	“ .....
“ 19–20.	†675	101.1	102.	101.6	100.8	....	....	101.4+	102.	“	10 p. m., .5 c.c.....
“ 19–20.	676	100.7	102.2	101.2	100.8	....	....	101.2+	102.2	“	10 p. m., .4 c.c.....
“ 19–20.	677	101.	102.2	100.8	101.4	....	....	101.3+	102.2	“	10 p. m., .5 c.c.....
“ 19–20.	678	101.9	102.	101.	100.4	....	....	101.3+	102.	“	“ .....
“ 19–20.	679	100.8	101.6	100.2	99.8	....	....	100.6	101.6	“	10 p. m., .4 c.c.....
“ 19–20.	680	101.	101.6	100.4	101.	....	....	101.	101.6	“	“ .....
“ 19–20.	681	101.2	101.8	101.4	101.4	....	....	101.4+	101.8	“	“ .....
“ 19–20.	682	101.1	101.6	101.4	101.4	....	....	101.4—	101.6	“	“ .....
“ 19–20.	683	103.1	103.6	104.8	105.2	....	....	104.2—	105.2	“	“ .....
“ 19–20.	684	101.5	102.	101.4	101.4	....	....	101.6—	102.	“	“ .....
“ 19–20.	†685	101.4	102.6	101.8	102.2	....	....	102.	102.6	“	“ .....
“ 19–20.	686	102.4	102.	101.4	100.6	....	....	101.6	102.	“	“ .....
“ 19–20.	687	100.9	102.	100.6	100.4	....	....	101.—	102.	“ ...	“ .....
“ 19–20.	688	101.4	100.6	101.4	100.8	....	....	101.+	101.4	“	10 p. m., .3 c.c.....
“ 19–20.	689	101.2	100.6	100.4	100.8	....	....	100.7+	101.2	“	10 p. m., .4 c.c.....
“ 19–20.	690	101.5	102.2	100.8	101.8	....	....	101.6—	102.2	“	“ .....
“ 19–20.	691	101.1	102.8	100.2	101.6	....	....	101.3—	102.8	“	“ .....
“ 19–20.	692	101.8	102.	102.4	101.8	....	....	102.	102.4	“	10 p. m., .5 c.c.....
“ 19–20.	†693	100.6	100.6	101.	100.8	....	....	100.7+	101.	“	10 p. m., .4 c.c.....
“ 19–20.	694	101.9	102.4	101.6	102.	....	....	102.—	102.4	“	“ .....
“ 19–20.	695	101.6	102.	101.2	101.4	....	....	101.5+	102.	“	“ .....
“ 19–20.	696	101.5	101.6	101.4	101.8	....	....	101.3+	101.6	“	“ .....
“ 19–20.	697	101.6	101.8	101.2	101.4	....	....	101.5	101.8	“	“ .....
“ 19–20.	698	101.4	101.8	101.8	101.	....	....	101.2+	101.8	“	“ .....
“ 19–20.	699	101.8	102.6	102.6	102.4	....	....	102.3+	102.6	“	“ .....
“ 19–20.	700	101.1	100.4	101.4	100.8	....	....	100.9+	101.4	“	“ .....
“ 23–24.	701	102.8	103.	103.2	....	102.1	....	102.8—	103.2	“	9.30 p. m., 5 c.c ...
“ 23–24.	702	101.8	101.8	101.2	....	101.	....	101.4+	101.8	“	9.30 p. m., 3 c.c ...
“ 23–24.	703	101.7	101.7	102.	....	101.5	....	101.7+	102.1	“	9.30 p. m., 4 c.c ...

TEMPERATURES. AFTER 8 a.m.	11 a.m.	2 p.m.	5 p.m.	8 p.m.	11 p.m.	Average.	Maximum.	Interval between injections and rise of temperature above maximum normal.	Duration of Rise.	Amount of Rise.	REMARKS.
								Hrs.	Hrs.	Deg.	
100.9	100.9	101.1	....	....	....	101.	101.1	..	..	..	Negative.
101.5	100.9	100.9	....	....	....	101.1	101.5	..	..	..	"
101.1	101.3	102.2	....	....	....	101.5+	102.2	..	..	..	"
100.6	100.9	100.8	....	....	....	100.7+	100.9	..	..	..	"
100.8	100.9	100.7	....	....	....	100.8	100.9	..	..	..	"
101.	101.3	101.6	....	....	....	101.3	101.6	16	..	.1	"
100.4	101.4	101.4	....	....	....	100.9+	101.4	13	3+	.5	"
100.7	101.3	100.9	....	....	....	100.9+	101.3	13	..	.3	"
100.7	101.3	101.	....	....	....	101.	101.3	..	..	..	"
100.5	101.3	100.9	....	....	....	100.9	101.3	..	..	..	"
100.3	101.3	101.1	....	....	....	100.9	101.3	..	..	..	"
101.2	101.8	101.5	....	....	....	101.5	101.8	..	..	..	"
100.5	101.3	101.3	....	....	....	101.	101.3	13	3+	.1	"
99.6	100.6	100.1	....	....	....	100.1	100.6	..	..	..	"
100.6	100.8	100.8	....	....	....	100.7+	100.8	..	..	..	"
100.5	101.1	101.1	....	....	....	100.9	101.1	..	..	..	"
100.	100.6	101.1	....	....	....	100.5+	101.1	16	..	.2	"
101.3	100.9	101.4	....	....	....	101.2	101.4	..	..	..	"
100.2	100.8	100.7	....	....	....	101.5+	100.8	..	..	..	"
100.7	100.9	101.2	....	....	....	100.9	101.2	..	..	..	"
100.8	100.8	102.	....	....	....	101.2	102.	16	..	.5	"
100.5	101.1	100.7	....	....	....	100.7+	101.1	..	..	..	"
100.9	101.4	101.	....	....	....	101.1	101.4	..	..	..	"
101.4	101.	100.4	....	....	....	100.9+	101.4	..	..	..	"
101.	100.2	102.2	....	....	....	101.1+	102.2	..	..	..	"
103.	104.9	104.	104.	104.	....	104.2—	104.9	10	12	2.1	Condemned; mst. gl.; mes. gl.; lgs.; liv.; spl.; thor.
103.1	104.8	105.8	105.8	105.	....	104.9	105.8	10	12	2.8	Condemned; mst. gl.; mes. gl.; lgs.
100.6	101.6	100.	....	....	....	100.9—	101.6	..	..	..	Negative.
105.8	105.6	105.8	105.8	104.4	....	105.5—	105.8	10	12	3.8	Condemned; subm. gl.; mst. gl.; lgs.
100.	100.6	107.4	107.4	....	...	104.5	107.4	16	6+	5.4	Condemned; mst. gl.; mm. gl.
99.6	101.6	103.	102.8	....	....	101.8	103.	16	3+	1.2	Negative.
100.8	101.2	104.2	105.	....	....	102.8	105.	16	3+	3.0	"
100.8	102.2	102.2	....	....	....	101.7	102.2	13	3+	.2	"
102.6	104.6	103.4	103.4	....	....	103.5	104.6	10	9+	2.6	"
100.6	101.4	101.6	....	....	....	101.2	101.6	..	..	..	"
103.2	105.2	105.2	104.4	103.8	....	104.4	105.2	10	12+	3.0	Condemned; mst. gl.; lgs.; thor.
101.	102.4	102.2	....	....	....	101.9	102.4	13	3+	.4	Negative.
100.6	102.	101.4	....	....	....	101.3+	102.	13	..	.4	"
100.6	101.8	100.6	....	....	....	101.	101.8	13	..	.2	"
101.3	101.6	102.6	....	....	....	101.8+	102.6	16	..	.8	"
101.4	104.7	105.4	103.8	103.2	....	103.7	105.4	13	9+	3.8	Condemned; mst. gl.
103.2	103.2	104.	....	....	....	103.5	104.	..	..	..	Negative.
100.4	100.8	102.8	....	....	....	101.3+	102.8	16	..	.8	"
104.	105.6	104.2	104.2	....	....	104.5	105.6	10	9+	3.0	"
101.2	102.	100.8	....	....	....	101.3+	102.	..	..	..	"
99.6	101.6	101.6	....	....	....	100.9+	101.6	..	..	..	"
100.8	101.4	102.	....	....	....	101.4	102.	16	..	.6	"
100.6	101.	101.	....	....	....	100.9—	101.	..	..	..	"
100.2	100.6	102.4	....	....	....	101.1	102.4	16	..	.2	"
100.8	102.4	103.	....	....	....	102.1—	103.	16	..	.2	"
101.5	102.4	103.2	....	....	....	102.4—	103.2	16	..	.8	"
101.	101.8	103.8	104.3	....	....	102.7+	104.3	13	6+	3.3	"
101.	103.	102.2	....	....	....	101.6	102.2	..	..	..	"
101.	101.8	102.	....	....	....	101.2	102.	..	..	..	"
102.	101.8	101.8	....	....	....	101.9—	102.	10	6	.4	"
101.	101.6	102.2	....	....	....	101.6	102.2	16	..	.4	"
104.	105.8	105.8	105.2	103.5	....	104.9	105.8	10	12+	.4	Condemned; mst. gl.; lgs.
100.8	102.8	102.9	....	....	....	102.2	102.9	13	3+	.3	Negative.
100.4	102.9	102.4	....	....	....	101.7	102.4	13	3+	.1	"
102.4	102.9	101.3	....	....	....	102.2	102.9	..	..	..	"
101.6	102.6	102.	....	....	....	102.1—	102.6	13½—	3+	.8	"
101.9	101.7	101.8	....	....	....	101.8	101.9	..	..	..	"

DATE.	TAG No.	TEMPERATURES.								TUBERCULIN INJECTION.	
		BEFORE						Average.	Maximum.		
		8 a. m.	11 a. m.	2 p. m.	5 p. m.	8 p. m.	11 p. m.			Site.	Time, Amount, etc.
1896.											
Nov. 23–24.	704	101.7	101.6	101.2	....	101.5	....	101.5	101.7	Neck....	9.30 p. m., 3 c. c ...
" 23–24.	705	102.6	102.5	101.5	....	102.	....	102.1+	102.6	"	9.30 p. m., 4 c. c ...
" 23–24.	706	100.	100.	99.	....	101.3	....	100.1—	101.3	"	" ...
" 23–24.	707	101.9	101.4	100.	....	101.4	....	101.2—	101.9	"	" ...
" 23–24.	708	101.8	101.1	100.9	....	102.	....	101.4+	102.	"	" ...
" 23–24.	709	101.1	101.8	100.9	....	101.2	....	101.2+	101.8	"	9.30 p. m., 5 c. c ...
" 23–24.	710	100.7	100.	99.2	....	100.2	....	100.+	100.7	"	" ...
" 23–24.	711	101.1	100.9	99.5	....	101.5	....	100.7+	101.5	"	9.30 p. m., 4 c. c ...
" 23–24.	712	100.	101.	99.3	....	101.2	....	100.4—	101.2	"	" ...
" 23–24.	713	101.8	101.4	101.4	....	101.2	....	101.4+	101.8	"	" ...
" 23–24.	714	100.	100.7	98.4	....	100.2	....	99.8+	100.7	"	" ...
" 23–24.	715	101.	101.4	100.5	....	100.8	....	100.9+	100.8	"	9.30 p. m., 5 c. c ...
" 23–24.	716	101.8	102.2	100.7	....	101.	....	101.4+	102.2	"	" ...
" 23–24.	717	101.2	101.	100.	....	101.3	....	100.9—	101.3	"	" ...
" 23–24.	718	101.7	102.2	101.1	....	101.3	....	101.6—	102.2	"	" ...
" 23–24.	719	101.8	102.2	102.4	....	102.4	....	102.2	102.4	"	9.30 p. m., 2.5 c. c..
" 23–24.	720	102.2	101.5	100.9	....	101.4	....	101.5	102.2	"	" ..
		8 a. m.	11 a. m.	4 p. m.	10 p. m.						
" 27–28.	721	101.8	101.8	100.6	101.	....	....	101.3+	101.8	....	10 p. m., 3 c. c......
" 27–28.	722	101.7	101.8	101.9	99.2	....	....	101.2+	101.9	....	" ......
" 27–28.	723	101.3	101.6	101.4	100.	....	....	101.1—	101.6	....	" ......
" 27–28.	724	102.3	102.2	101.2	101.	....	....	101.7—	102.3	....	" ......
" 27–28.	725	101.3	100.1	101.3	100.5	....	....	100.8	101.3	....	" ......
" 27–28	†726	101.8	101.4	101.3	99.7	....	....	101.+	101.8	....	" ......
" 27–28.	727	101.1	101.3	100.9	99.8	....	....	100.8—	101.3	....	10 p. m., 4 c. c......
" 27–28.	728	100.3	101.4	100.9	98.5	....	....	100.3—	101.4	....	10 p. m., 3 c. c......
" 27–28.	729	100.8	101.4	101.	100.	....	....	100.8	101.4	....	10 p. m., 3.5 c. c ...
" 27–28.	†730	103.3	104.2	103.2	101.8	....	....	103.1+	104.2	....	....
" 27–28.	731	100.3	101.6	101.3	100.1	....	....	100.8+	101.6	....	10 p. m., 3 c. c......
" 27–28.	732	101.3	101.2	101.	100.2	....	....	100.9+	101.3	....	" ......
" 27–28.	733	101.4	101.1	101.4	98.4	....	....	100.6—	101.4	....	" ......
" 27–28.	734	100.4	101.5	101.4	100.4	....	....	100.9+	101.5	....	10 p. m., 5 c. c......
" 27–28.	735	101.7	102.	102.1	100.8	....	....	101.6+	102.1	....	" ......
" 27–28.	736	101.6	101.3	101.3	100.4	....	....	101.1+	101.6	....	10 p. m., 4 c. c......
" 27–28.	†737	101.6	101.2	100.	100.3	....	....	100.8	101.6	....	" ......
" 27–28.	738	102.2	102.4	101.8	100.4	....	....	101.7	102.4	....	" ......
" 27–28.	739	101.3	101.2	100.8	100.9	....	....	101.+	101.3	....	" ......
" 27–28.	740	101.	101.	100.8	100.5	....	....	100.8+	101.	....	10 p. m., 5 c. c.....
" 27–28.	741	101.6	101.8	101.2	101.8	....	....	101.6	101.8	....	10 p. m., 4 c. c......
" 27–28.	742	102.1	101.7	101.4	100.5	....	....	101.4+	102.1	....	" ......
" 27–28.	743	101.2	101.2	103.7	100.6	....	....	101.7—	103.7	....	" ......
" 27–28.	744	101.	101.	101.	100.5	....	....	100.9—	101.	....	10 p. m., 3 c. c......
" 27–28.	745	101.7	101.6	101.8	100.4	....	....	101.4—	101.8	....	10 p. m., 4 c. c .....
" 27–28.	746	100.7	101.4	101.	100.5	....	....	100.9	101.	....	" ......
" 27–28.	747	100.8	100.2	100.5	100.3	....	....	100.4+	100.8	....	" ......
" 27–28.	748	101.5	101.4	100.8	100.4	....	....	101.+	101.5	....	" ......
" 27–28.	749	101.	101.6	101.2	100.4	....	....	101.+	101.6	....	" ......
" 27–28.	750	101.7	100.2	101.2	101.4	....	....	101.1+	101.7	....	" ......
" 27–28.	751	101.4	101.5	101.6	100.9	....	....	101.3+	101.6	....	" ......
" 27–28.	752	101.3	101.4	100.	100.5	....	....	100.8	101.4	....	10 p. m., 5 c. c......
		8 a. m.	11 a. m.	2 p. m.	5 p. m.	8 p. m.	11 p. m.				
" 27–28.	753	102.	102.6	102.	100.1	....	....	101.8+	102.6	....	10 p. m., 4 c. c......
" 27–28.	754	102.	101.6	102.	101.6	....	....	101.8	102.	....	10 p. m., 3 c. c ....
Dec. 1....	755	101.7	101.	102.	101.5	....	....	101.5+	101.7	....	10 p. m., 4 c. c......
" 1 ...	756	101.5	101.2	101.8	100.8	....	....	101.3+	101.8	....	" ......
" 1....	757	101.	101.2	100.6	101.3	....	....	101.+	101.3	....	" ......
" 1....	758	102.4	100.5	99.	99.4	....	....	100.3+	102.4	....	" ......
" 1....	759	101.5	100.5	102.	100.6	....	....	101.1+	102.	....	" ......
" 1....	760	100.5	100.	100.4	99.1	....	....	100.	100.5	....	" ......
" 1....	761	100.7	100.5	101.	99.1	....	....	100.3+	101.	....	" ......
" 1....	762	101.5	101.	101.5	101.1	....	....	101.3—	101.5	....	" ......
" 1....	763	101.9	101.4	101.5	101.2	....	....	101.5	101.9	....	" ......
" 1....	764	101.3	101.5	101.2	100.5	....	....	101.1+	101.5	....	" ......

Temperatures.						Average.	Maximum.	Interval between injections and rise of temperature above maximum normal.	Duration of Rise.	Amount to Rise.	Remarks.
After											
8 a.m.	11 a.m.	2 p.m.	5 p.m.	8 p.m.	11 p.m.						
								Hrs.	Hrs.	Deg.	
102.6	101.8	101.8	....	....	....	102.1—	102.6	10½—	6+	.9	Negative.
102.6	102.3	101.5	....	....	....	102.1+	102.6	..	..	..	"
101.5	101.5	101.5	....	....	....	101.5	101.5	10½—	6+	.2	"
102.2	101.7	102.	....	....	....	102.—	102.2	10½—	..	.3	"
101.5	102.	101.4	....	....	....	101.6+	102.	..	..	..	"
101.4	101.3	101.5	....	....	....	101.4	101.5	..	..	..	"
100.8	100.9	101.5	....	....	....	101.1—	101.5	10½—	6+	.8	"
101.6	100.8	100.4	....	....	....	100.9+	101.6	10½—	..	.1	"
101.2	101.4	101.3	....	....	....	101.3	101.4	13½—	3+	.2	"
101.5	101.3	101.1	....	....	....	101.3	101.5	..	..	..	"
101.4	101.2	100.4	....	....	....	101.	101.4	10½—	3+	.7	"
101.4	101.4	102.1	....	....	....	101.6+	102.1	10½—	6+	1.3	"
101.6	101.4	101.8	....	....	....	101.6	101.8	..	..	..	"
101.6	102.2	99.8	....	....	....	101.2	102.2	10½—	3+	.9	"
101.6	101.6	101.7	....	....	....	101.6+	101.7	..	..	..	"
102.3	102.2	102.1	....	....	....	102.2	102.3	..	..	..	"
101.4	101.5	101.4	....	....	....	101.4+	101.5	..	..	..	"
101.1	101.5	102.1	....	....	....	101.6	102.1	16—	..	.3	"
106.4	105.3	106.	105.2	....	....	105.6	106.4	10—	9+	4.5	Condemned ; lgs. ; mst. gl.
101.	100.7	101.	....	....	....	100.9	101.	..	..	..	Negative.
101.5	100.	101.2	....	....	....	100.9	101.5	..	..	..	"
99.	101.	101.	....	....	....	100.3+	101.	..	..	..	"
100.8	101.7	104.4	103.6	....	....	102.6+	104.4	16—	3+	2.6	"
100.6	100.	100.4	....	....	....	100.3+	100.6	..	..	..	"
101.6	101.5	99.5	....	....	....	100.9—	101.6	10—	3+	.2	"
101.2	101.2	101.5	....	....	....	101.3	101.5	16—	..	.1	"
....	....	....	....	....	....	....	....	..	..	..	Not tested.
100.1	100.	100.7	....	....	....	100.3—	100.7	..	..	..	"
100.8	100.8	100.8	....	....	....	100.8	100.8	..	..	..	"
100.7	101.3	101.2	....	....	....	101.1—	101.3	..	..	..	"
99.5	100.9	101.	....	....	....	100.5—	101.6	..	..	..	"
100.7	101.	101.5	....	....	....	101.1—	101.5	..	..	..	"
101.3	100.8	99.9	....	....	....	100.7—	101.3	..	..	..	Negative.
102.1	102.4	104.3	103.6	....	....	103.1	104.3	10—	9+	2.7	"
102.7	103.9	105.7	105.2	....	....	104.4—	105.7	10—	9+	3.3	Condemned ; mst. gl. ; pl. ; lgs.
105.1	106.5	105.5	105.2	....	....	105.6—	106.5	10—	9+	5.2	Condemned ; lgs. ; mst. gl.
101.	100.5	101.4	....	....	....	101.—	101.4	16—	..	4	Negative.
101.5	101.4	101.4	....	....	....	101.4+	101.5	..	..	..	"
101.6	101.2	100.6	....	....	....	101.1+	101.6	..	..	..	"
101.8	101.8	105.7	105.2	....	....	103.6+	105.7	16—	3+	2.	"
101.9	101.6	101.5	....	....	....	101.7—	101.9	10—	6+	.9	"
100.9	101.	101.	....	....	....	101.—	101.	..	..	..	"
101.	103.3	101.	....	....	....	101.1	101.3	13—	..	.3	"
102.4	103.5	105.2	103.4	....	....	103.6+	105.2	10—	9+	4.4	Condemned ; lgs. ; mst. gl.
100.2	104.4	104.7	....	....	....	103.3+	104.7	13—	3+	3.2	Condemned ; mst. gl. ; mm. ; lc.
101.	100.9	101.	....	....	....	101.—	101.	..	..	..	Negative.
106.5	105.7	105.3	104.4	....	....	105.5	106.5	10—	9+	4.8	Condemned ; mst. gl. ; mm. ; lc.
101.2	101.	101.4	....	....	....	101.2	101.4	..	..	..	Negative.
100.8	100.7	100.8	....	....	....	100.8—	100.8	..	..	..	"
102.	101.1	100.7	....	....	....	101.3—	102.	..	..	..	"
101.2	101.	101.	....	....	....	101.1—	101.2	..	..	..	"
101.4	100.9	100.8	....	....	....	101.+	101.4	..	..	..	"
101.4	101.6	100.4	....	....	....	101.1+	101.6	..	..	..	"
101.4	101.5	102.1	....	....	....	101.7—	102.1	10—	6+	.8	"
101.8	100.8	99.6	....	....	....	100.7+	101.8	..	..	..	"
105.	106.1	106.	....	....	....	105.7	106.1	10—	6+	4.1	Condemned; mst. gl. ; liv. ; lgs. ; mm. gl.
100.5	100.7	101.	....	....	....	104.1—	101.	13—	3+	.5	Negative.
100.2	100.2	98.8	....	....	....	99.7+	100.2	..	..	..	"
101.	99.5	100.1	....	....	....	100.2	101.	..	..	..	"
101.3	101.5	101.6	....	....	....	101.5—	101.6	..	..	..	"
100.5	99.	100.3	....	....	....	99.9+	100.5	..	..	..	"

DATE.	TAG No.	TEMPERATURES.								TUBERCULIN INJECTION.	
		BEFORE									
		8 a. m.	11 a. m.	2 p. m.	5 p. m.	8 p. m.	11 p. m.	Average.	Maximum.	Site.	Time, Amount, etc.
1896.											
Dec. 1....	765	101.2	100.5	100.8	100.5	....	....	100.7+	101.2	Neck....	10 p. m., 4 c. c .....
" 1....	765	101.8	100.6	101.3	99.6	....	....	100.8+	101.8	"	" ......
" 1....	767	100.6	100.5	99.	99.5	....	....	99.9	100.6	"	10 p. m., 5 c. c......
" 1....	768	102.2	101.8	102.	100.8	....	....	101.7	102.2	"	10 p. m., 4 c. c......
" 1....	769	101.6	100.7	100.8	100.5	....	....	100.9	101.6	"	" ......
" 1....	770	101.6	101.2	101.	100.8	....	....	101.1+	101.6	"	" ......
" 1....	771	100.2	101.	101.4	100.4	....	....	100.7+	101.4	"	10 p. m., 5 c. c......
" 1....	772	101.	100.6	100.6	100.	....	....	100.5+	101.	"	10 p. m., 4 c. c......
" 1....	773	101.8	101.	101.5	101.	....	....	101.3+	101.8	"	" ......
" 1....	774	101.8	101.1	100.6	98.8	....	....	100.6—	101.8	"	" ......
" 1....	775	101.8	101.3	101.4	100.8	....	....	101.3+	101.8	" ...	" ......
" 1....	776	100.8	100.6	100.9	100.8	....	....	100.8—	100.9	"	" ......
" 1....	777	101.5	101.2	100.4	101.	....	....	101.+	101.5	"	" ......
" 1....	778	101.2	101.5	101.	100.8	....	....	101.1+	101.5	"	" ......
" 1....	779	101.8	101.3	101.2	99.5	....	....	100.9+	101.8	"	" ......
" 3-4..	780	101.4	101.	101.2	99.6	....	....	100.8	101.4	"	" ......
" 3-4..	781	100.	101.2	100.1	100.4	....	....	100.4+	101.2	"	" ......
" 3-4..	782	102.2	101.	101.4	99.3	....	....	101.—	102.2	"	" ......
" 3-4..	783	100.7	100.8	100.	98.6	....	....	100.+	100.8	"	10 p. m., 5 c. c......
" 3-4..	784	100.5	101.5	101.8	99.5	....	....	100.8+	101.8	"	10 p. m., 4 c. c .....
" 3-4..	785	101.6	101.6	101.9	100.6	....	....	101.6+	101.9	" ...	10 p. m., 5 c. c......
" 3-4..	786	102.5	102.	100.3	100.8	....	....	101.4	102.5	"	10 p. m., 3 c. c......
" 3-4..	787	101.	101.9	101.2	100.4	....	....	101.1+	101.9	"	10 p. m., 4 c. c......
" 3-4..	788	101.5	101.6	100.7	100.4	....	....	101.+	101.6	"	10 p. m., 3 c. c......
" 3-4..	789	100.8	101.5	100.5	100.0	....	....	100.7	101.5	"	10 p. m., 4 c. c......
" 3-4..	790	101.3	101.6	101.	100.6	....	....	101.1+	101.6	"	" ......
" 3-7..	791	100.3	101.	100.6	99.	....	....	100.2+	101.	"	" ......
" 3-4..	792	101.	101.	101.4	100.1	....	....	100.9	101.4	"	10 p. m., 5 c. c......
" 3-4..	793	101.8	102.4	101.8	100.5	....	....	101.6+	102.4	"	10 p. m., 4 c. c......
" 3-4..	794	101.	101.5	101.	101.0	....	....	101.1+	101.5	"	" ......
" 3-4..	795	99.	102.	100.4	99.5	....	....	100.2+	102.	"	" ......
" 3-4..	796	101.6	101.2	101.3	100.	....	....	101.+	101.6	"	" ......
" 3-4..	797	100.5	101.2	100.5	100.2	....	....	100.6	101.2	"	" ......
" 3-4..	798	100.7	101.3	101.7	99.	....	....	100.7	101.7	"	" ......
" 3-4..	799	101.	101.7	101.3	110.4	....	...	101.1	101.7	"	" ......
Nov. 24-25.	801	101.6	101.4	101.4	101.	101.2	....	101.3+	101.6	"	" ......
" 24-25.	802	101.4	101.	101.2	101.	101.	...	101.1+	101.4	"	10 p. m., 5 c. c......
" 24-25.	803	101.4	101.	100.	101.	101.	....	100.9—	101.4	"	10 p. m., 4 c. c......
" 24-25.	804	101.0	101.	101.	101.	101.	....	101.	101.	"	" ......
" 24-25.	805	101.4	101.4	102.	101.6	101.	....	101.5—	102.	"	" ......
" 24-25.	806	101.4	101.2	102.	101.	101.4	....	101.4	102.	"	" ......
" 24-25.	807	101.4	101.4	101.	101.2	101.6	....	101.3+	101.6	"	" ......
" 24-25.	808	101.6	101.4	101.	101.2	101.2	....	101.5—	101.6	"	" ......
" 24-25.	809	101.6	101.4	101.	101.2	101.2	...	101.5—	102.1	"	" ......
" 24-25.	810	101.	101.	101.	101.	102.	....	101.+	101.4	"	" ......
" 24-25.	811	101.4	101.4	101.	101.4	101.	....	101.2+	101.2	"	" ......
" 24-25.	812	100.6	101.	100.	101.	101.2	....	100.8—	101.2	"	" ......
" 24-25.	813	101.	101.	101.	101.	101.2	....	101.+	101.6	"	10 p. m., 5 c. c......
" 24-25.	814	101.4	101.4	102.	101.2	101.	....	101.4	102.	"	" ......
" 24-25.	815	101.	101.4	101.2	101.	101.2	....	101.2—	101.4	"	10 p. m., 4 c. c......
" 24-25.	816	101.4	101.4	101.0	101.6	102.	....	101.6	102.	"	10 p. m., 5 c. c......
" 24-25.	817	101.	101.2	100.4	101.	101.	....	100.9+	101.2	" ...	" ......
" 24-25.	818	101.2	102.	101.6	101.	102.	....	101.6—	102.	"	" ......
" 24-25.	819	101.6	101.2	101.4	101.	100.	....	101.+	101.6	"	10 p. m., 4 c. c......
" 24-25.	820	101.4	101.4	101.	101.4	101.6	....	101.3+	101.6	"	" ......
" 24-25.	821	101.6	101.	101.6	101.4	101.6	....	101.4+	101.6	"	10 p. m., 5 c. c......
" 24-25.	822	101.4	101.	100.	102.	101.	....	101.+	102.	"	10 p. m., 4 c. c......
" 24-25.	823	100.	100.2	101.	101.4	101.2	....	100.8+	101.4	"	" ......
" 24-25.	824	101.	100.6	101.4	101.4	101.	....	101.3—	101.4	"	" ......
" 24-25.	†825	100.6	101.	100.	100.4	101.	....	100.5	101.	"	" ......

TEMPERATURES.					Average.	Maximum.	Interval between injections and rise of temperature above maximum normal.	Duration of Rise.	Amount of Rise.	REMARKS.
AFTER										
11 .m.	2 p. m.	5 p. m.	8 p. m.	11 p. m.						
							Hrs.	Hrs.	Deg.	
9.8	100.1	....	....	....	100.1+	100.5	..	..	..	Negative.
0.4	100.3	....	....	....	100.6—	101.	..	..	..	"
0.3	101.3	....	....	....	100.2	101.3	16—	..	.7	"
1.7	100.4	....	....	....	101.1	101.7	..	..	..	"
0.8	100.8	....	....	....	101.1+	101.8	10—	..	.2	"
1.	101.4	....	....	...	101.4	101.8	10—	..	.2	"
1.8	102.2	....	....	....	101.3+	102.2	13—	3+	.8	"
0.	101.2	....	....	....	100.8—	101.2	10—	..	.2	"
0.8	100.6	....	....	....	100.9—	101.2	..	..	..	"
0.	100.2	....	....	....	100.—	100.2	..	..	..	"
1.3	101.7	....	....	....	101.3	101.7	..	..	..	"
0.8	101.5	....	....	....	101.+	101.5	16—	..	.6	"
0.7	100.5	....	....	....	100.7—	100.8	..	..	..	"
0.9	101.	....	....	....	101.1	101.4	..	..	..	"
0.	101.	....	....	....	100.4+	101.	..	..	..	"
2.	100.8	102.3	....	....	101.5+	102.3	13—	..	.7	"
2.8	102.6	103.	....	....	102.6+	103.	10—	9+	1.8	"
3.6	105.2	105.4	....	....	104.—	105.4	13—	6+	3.2	Condemned; mst. gl.
2.1	102.8	102.5	....	....	101.8+	102.8	13—	6+	2.	Negative.
5.4	105.2	106.	....	....	104.7—	106.	10—	9+	3.2	Condemned; mst. gl.; lgs.
2.	103.4	103.6	....	....	102.5+	103.6	13—	6+	1.7	Negative.
5.4	105.4	106.6	....	....	104.9+	106.6	13—	6+	4.1	Condemned; perit.; mst. gl.
5.6	105.2	103.8	....	....	104.5+	105.6	10—	19+	3.7	Condemned; mst. gl.; pl.; lgs.
5.7	104.8	105.2	....	....	105.4+	106.1	10—	19+	4.5	Condemned; mst. gl.; lgs.
1.2	101.6	100.5	....	....	100.9	101.6	6	..	.1	Negative.
1.	101.	101.5	....	....	101.1+	101.5	..	..	..	"
6.	104.6	105.9	....	....	105.5+	106.	10—	19+	5.	Condemned; mst. gl.; lgs.
6.	103.8	103.8	....	....	105.2+	107.3	10—	19+	5.9	Condemned; lgs.; liv.
1.	102.4	102.4	...	....	101.8—	102.4	..	..	..	Negative.
1.5	103.	104.5	....	....	101.9—	104.5	16—	3+	.6	"
4.9	106.1	106.	....	....	104.9—	106.1	10—	19+	4.1	Condemned; br. gl.; l. lg.
2.2	102.8	103.8	....	....	102.3	103.8	13—	6+	2.2	Negative.
6.3	104.4	105.	....	....	105.5	106.3	10—	19—	5.1	Condemned; mst. gl.
3.3	102.7	104.	....	....	102.8+	104.	13—	6+	2.3	Negative.
1.6	101.8	101.5	....	....	101.6+	101.8	16—	..	.1	"
6.5	105.2	....	....	....	101.3+	106.5	10—	16+	4.9	Condemned; thor.; abd.; mst. gl.; lgs.; liv.; spl.
2.8	101.9	....	....	....	101.1+	102.8	10—	16+	1.4	Negative.
3.	103.	....	....	....	100.9—	103.	10—	16+	1.6	"
2.1	102.	....	....	....	101.	102.1	10—	16+	1.1	"
1.8	103.1	....	....	....	101.5—	103.1	16—	..	1.1	"
1.9	101.2	....	....	....	101.4	101.9	..	..	..	"
5.8	105.3	....	....	....	101.3+	105.8	10—	16+	3.8	Condemned; lgs.; mst. gl.; liv.
2.4	103.5	....	....	....	101.3—	103.5	10—	16+	1.9	Negative.
2.9	103.7	....	....	....	101.2	103.7	13—	3+	1.7	"
5.	105.1	103.9	....	....	101.2+	105.1	10—	19	3.7	Condemned; lgs.; mst.; liv
1.4	101.4	....	....	....	100.8	101.4	10—	16	.2	Negative.
2.6	102.5	....	....	....	101.+	102.6	10—	16	1.4	"
4.9	103.9	104.	....	....	101.1+	106.4	10—	19	4.8	Condemned; liv.; lgs., mst. gl.; mes. gl.
6.6	103.2	102.5	....	....	101.4	106.6	10—	19	4.6	Condemned; lgs.; mst. gl.; mes. gl.; liv.
2.9	103.4	....	....	....	101.2	103.4	13—	6—	2.	Negative.
5.5	104.	104.	....	....	101.6	105.	10—	19	3.5	Condemned; l. lg., mst. gl.; mes. gl.
6.8	104.6	....	....	....	101.9	107.4	10—	16	6.2	Condemned; l. lg.; mst. gl.
2.4	101.8	....	....	....	101.6	102.4	12+	..	.4	Negative.
1.	100.5	....	....	....	101.+	101.2	..	..	..	"
6.5	103.5	....	....	....	101.4	106.5	10—	6+	4.9	Condemned; lgs.; mst. gl.; liv.
6.7	104.	105.5	....	....	101.4	106.7	10—	9+	5.1	Condemned; lgs.; mst. gl.
1.6	100.8	....	....	....	101.2	101.6	..	..	..	Negative.
4.	103.3	....	....	....	100.8—	104.	10—	6+	2.6	"
5.4	103.6	103.3	....	....	101.1	105.4	10—	9+	4.	Condemned; mst. gl.
3.2	103.7	....	....	....	100.6	103.7	10—	6+	2.7	Negative.

Date.	Tag No.	Temperatures.						Average.	Maximum.	Tuberculin Injection.	
		Before									
		8 a.m.	11 a.m.	2 p.m.	5 p.m.	8 p.m.	11 p.m.			Site.	Time, Amount, etc.
1896.											
Nov. 24-25.	826	101.4	100.2	102.	101.2	101.	....	101.2—	102.	Neck....	10 p.m., 4 c.c .....
" 24-25.	827	101.6	100.4	102.	101.4	100.	....	101.1—	102.	"	" .....
" 24-25.	828	100.6	101.4	101.	100.2	100.2	....	100.7—	101.4	"	" ....
" 24-25.	829	100.6	100.4	101.	101.	101.	....	100.8	101.	"	10 p.m., 4½ c.c....
" 24-25.	830	101.1	101.1	102.	101.	101.	....	101.2+	102.	"	" ....
" 27-28.	831	101.	101.4	101.4	101.4	101.6	....	101.4—	101.6	"	" ....
" 27-28.	832	101.2	100.7	101.4	101.	100.2	....	100.9	101.4	"	" ....
" 27-28.	833	102.2	101.4	100.6	102.	101.4	....	101.5+	102.2	"	" ....
" 27-28.	*834	101.4	101.	102.	101.2	101.6	....	101.4+	101.6	"	" ....
" 27-28.	835	101.	101.4	101.4	102.2	101.2	....	101.4+	102.2	"	" ....
" 27-28.	836	101.	101.7	102.2	101.4	100.6	....	101.4—	102.2	"	" ....
" 27-28.	*837	101.2	101.2	101.6	102.	101.	....	101.4	102.	"	" ....
" 27-28.	838	100.4	101.1	100.6	101.2	100.4	....	100.7	101.2	"	" ....
" 27-28.	839	102.	101.6	102.	102.2	101.	....	101.8—	102.2	"	" ....
" 27-28.	840	101.6	100.9	101.	101.6	100.2	...	101.+	101.6	"	" . ..
" 27-28.	841	102.4	102.4	102.2	103.2	102.4	....	102.5+	103.2	"	" ....
" 27-28.	842	101.	100.8	101.2	101.2	100.	....	100.8+	101.2	"	" ....
" 27-28.	†843	101.4	101.5	101.2	102.	101.	....	101.4	101.5	"	" ....
" 27-28.	844	101.6	101.6	102.	101.6	101.	....	101.6—	102.	"	" ....
" 27-28.	*845	101.6	101.5	101.4	102.	101.	....	101.5	102.	"	" ....
" 27-28.	846	101.2	100.6	101.2	101.6	100.4	....	101.	101.2	"	" ....
" 27-28.	847	101.2	101.2	101.4	101.	101.	....	101.1+	101.4	"	" ....
" 27-28.	848	101.6	100.7	100.4	101.6	100.2	....	100.9	101.6	"	" ....
" 27-28.	849	101.6	101.5	101.2	102.	101.4	....	101.5+	102.	"	" ....
" 27-28.	850	101.4	101.	101.4	101.4	102.	....	101.4+	102.	"	" ....
" 27-28.	851	102.	101.7	102.	102.	102.2	....	101.9+	102.2	"	" ....
" 27-28.	852	101.	101.	101.2	101.	100.2	....	100.9—	101.2	"	" ....
" 27-28.	853	101.	101.4	101.4	101.	101.2	....	101.2	101.4	"	" ....
" 27-18.	*854	103.	102.7	103.	102.6	102.4	....	102.7	103.	"	" ....
" 27-28.	*855	102.	102.	103.	103.2	103.8	....	102.8	103.8	"	" ....
" 27-28.	856	101.4	101.9	102.4	102.2	101.	....	101.8—	102.4	"	" ...
" 27-18.	857	101.4	101.7	102.	102.	102.	....	101-8+	102.	"	" ....
" 27-28.	858	101.	101.	101.4	101.2	101.2	....	101.2—	101.4	"	" ....
" 27-28.	859	101.2	101.5	101.4	101.4	101.	....	101.3	101.5	"	" ....
Dec. 1-2...	860	101.6	100.	101.1	101.	98.	....	100.7	101.6	"	" ....
" 1-2...	861	101.3	101.	101.	101.	100.	....	100.9	101.3	"	10 a.m., 4 c.c., No. 6.
" 1-2...	862	102.	100.5	101.5	101.2	100.	....	101.1+	102.	"	"
" 1-2...	863	101.5	101.8	101.7	101.6	100.4	....	101.4	101.8	"	"
" 1-2...	864	101.6	101.5	102.2	102.4	100.8	....	101.7	102.4	" . .	"
" 1-2...	865	101.7	101.1	101.2	101.	100.2	....	101.	101.7	"	"
" 1-2...	866	100.8	100.	101.2	100.4	100.6	....	100.6	101.2	"	"
" 1-2...	867	100.1	99.5	100.7	100.4	98.	....	99.7+	100.7	"	"
" 1-2...	868	101.2	100.9	101.4	101.2	100.4	....	101.+	101.4	"	"
" 1-2...	869	99.	100.7	100.2	100.6	98.2	....	100.1	100.7	"	"
" 1-2...	870	100.5	100.6	101.	101.	99.8	....	100.6	101.	"	"
" 1-2...	871	101.4	101.6	101.8	101.2	100.2	....	101.2+	101.8	"	"
" 1-2...	872	102.	101.2	101.7	101.4	101.	....	101.5	102.	"	"
" 1-2...	873	101.2	101.2	101.2	101.2	100.6	....	101.1	101.2	"	"
" 1-2...	874	101.	101.5	101.7	101.8	100.	....	101.2	101.8	"	"
" 1-2...	875	101.6	101.	101.	101.6	101.	....	101.2	101.6	"	"
" 1-2...	876	99.	101.1	100.7	101.	99.	....	100.2	101.1	"	"
" 1-2...	877	101.	101.2	101.2	101.	98.2	....	100.5	101.2	"	"
" 1-2...	878	101.	101.6	101.3	100.2	100.	....	100.8	101.6	"	"
" 1-2...	879	101.	101.8	101.9	101.6	100.	....	101.3	101.9	"	10 a.m., 3 c.c......
" 1-2...	880	99.	100.2	101.3	101.	99.2	....	100.1	101.3	"	10 a.m., 4 c.c......
" 1-2...	881	100.	101.5	100.6	101.	99.4	....	100.5	101.5	"	" .....
" 1-2...	882	100.4	101.5	102.3	102.4	100.	....	101.3	102.4	"	" .....
" 1-2...	883	101.	101.7	101.6	101.	100.2	...	101.1	101.7	"	" .....
" 1-2...	884	101.2	100.6	101.8	101.	101.	....	101.1	101.8	"	" .....
" 1-2...	885	100.2	101.1	101.2	101.	100.4	....	100.6	101.2	"	" .....
" 1-2...	886	99.	101.5	101.4	101.	99.	....	100.4	101.5	"	" .....
" 1-2...	887	100.2	101.5	101.6	102.	102.	....	101.5	102.	"	10 p.m., 3 c.c......
" 1-2...	883	101.	101.4	101.8	101.4	101.6	....	101.4+	101.8	"	10 p.m., 4 c.c......

	TEMPERATURES.					Average.	Maximum.	Interval between injections and rise of temperature above maximum normal.	Duration of Rise.	Amount of Rise.	REMARKS.
	AFTER										
.	11 a.m.	2 p.m.	5 p.m.	8 p.m.	11 p.m.						
								Hrs.	Hrs.	Deg.	
6	101.7	102.2	....	....	....	101.2	102.2	15+	..	.2	Negative.
2	106.4	105.6	105.1	....	....	101.3	106.4	10—	9+	4.4	Condemned; l. lgs.; mst. gl.; liv.
6	105.5	103.	104.4	....	....	100.7	106.6	10—	9+	5.2	Condemned; lgs.; mst. gl.
7	105.6	103.9	103.	....	....	100.8	105.7	10—	9+	4.7	Condemned; lgs.; mst. gl.
5	106.6	104.	102.5	....	....	101.4	106.6	10—	9+	4.6	Condemned; lgs.; mst. gl.; mes. gl.
2	101.2	102.	....	....	....	101.1+	101.2	..	..	..	Negative.
	101.4	100.6	....	....	....	101.	101.4	..	..	..	"
6	101.2	101.6	....	....	....	101.1+	101.6	..	..	..	"
	102.	101.	....	....	....	101.	102.	12+	..	.4	Negative; all parts healthy.
5	99.	101.2	....	....	....	99.2+	101.2	..	..	..	Negative.
4	104.6	102.6	....	....	....	102.8+	104.6	10—	6+	2.6	"
6	104.4	103.6	....	....	....	103.8+	104.4	10—	6+	2.4	Negative; all parts healthy.
4	101.2	101.	....	....	....	100.8+	101.2	..	..	..	Negative.
4	101.	101.	....	....	....	100.8	101.	..	..	..	"
	100.	100.	....	....	....	100.	100.	..	..	..	"
4	104.2	104.2	102.6+	....	....	103.3+	104.2	12+	6+	1.	"
	100.6	101.2	....	....	....	100.2+	101.2	..	..	..	"
4	105.	103.2	104.	....	....	103.4	105.	12+	6+	3.5	"
4	102.	101.2	....	....	....	101.2	102.	..	..	..	"
6	101.2	102.	....	....	....	101.6	102.	..	..	..	Negative; all parts healthy.
	101.2	100.	....	....	....	100.+	101.2	..	..	..	Negative.
6	105.2	103.	102.6	....	....	104.1	105.6	10—	9+	4.2	Condemned; mst. gl.; liv.
2	100.2	102.2	....	....	....	100.8+	102.2	15+	..	.6	Negative.
6	101.	101.4	....	....	....	101.	101.4	..	..	..	"
6	104.	103.4	....	....	....	102.7—	104	12+	3+	.2	"
	101.2	101.4	....	....	....	101.5+	101.4	..	..	..	"
	101.	100.6	....	....	....	100.6+	101.	..	..	..	"
	101.	101.2	....	....	....	101.+	101.2	..	..	..	"
	102.6	102.2	....	....	....	102.2+	102.6	..	..	..	Negative; all parts healthy.
	102.2	102.2	....	....	....	102.2+	102.2	..	..	..	" "
	107.2	106.6	107.	....	....	106.7	107.2	10—	9+	4.8	Condemned; mst. gl.; liv.
	101.4	102.	....	....	....	101.8	102.	..	..	..	Negative.
6	100.6	100.	....	....	....	100.+	100.6	..	..	..	"
	101.4	100.	....	....	....	100.8	101.4	..	..	..	"
4	101.1	101.2	....	....	....	101.2+	101.4	..	..	..	"
5	101.1	101.2	....	....	....	101.3—	101.5	10—	..	.2	"
5	101.1	101.2	....	....	....	101.3	101.5	..	..	..	"
3	100.4	100.9	....	....	....	100.5	100.9	..	..	..	"
2	101.4	101.9	....	....	....	101.2	101.9	..	..	..	"
7	100.8	101.2	....	....	....	100.9	101.2	..	..	..	"
	99.2	100.4	....	....	....	99.9	100.4	..	..	..	"
4	98.5	99.9	....	....	....	99.3	99.9	..	..	..	"
1	101.3	100.4	....	....	....	100.9	101.3	..	..	..	"
	99.	100.2	....	....	....	100.	100.2	..	..	..	"
2	106.3	105.9	....	....	....	105.5	106.3	10—	6—	5.3	Condemned; l. lg.; mst. gl.; liv.: omt.; s. int.; abd. cav.
6	100.9	100.8	....	....	....	100.8	100.9	..	..	..	Negative.
8	101.2	101.9	....	....	....	101.3	101.9	..	..	..	"
3	101.5	101.5	....	....	....	101.1	101.5	12+	3+	.3	"
8	101.	100.7	....	....	....	100.8+	101.	..	..	..	"
	101.6	101.	....	....	....	101.2	101.6	..	..	..	"
2	100.	99.9	....	....	....	99.7	100.	..	..	..	"
8	99.5	100.7	....	....	....	100.3	100.7	..	..	..	"
	101.	101.2	....	....	....	100.7	101.2	..	..	.4	"
4	101.4	102.	....	....	....	101.3	102.	15+	..	.1	"
5	101.3	101.	....	....	....	101.3	101.5	10—	..	.2	"
5	102.6	102.7	....	....	....	102.3	102.7	12+	3+	1.2	"
3	102.3	102.4	....	....	....	102.3	102.4	..	..	..	"
1	100.5	101.1	....	....	....	100.9	101.1	..	..	..	Negative.
5	101.6	101.3	....	....	....	101.5	101.6	..	..	..	"
4	100.4	101.1	....	....	....	100.6	101.1	..	..	..	"
1	100.6	100.4	....	....	....	100.3	100.6	..	..	..	"
	101.4	101.2	....	....	....	101.5	102.	..	..	..	"
7	101.4	101.9	....	....	....	101.7	101.9	16—	3—	.1	"

DATE.	TAG No.	TEMPERATURES.						Average.	Maximum.	TUBERCULIN INJECTION.	
		BEFORE									
		8 a. m.	11 a. m.	2 p. m.	5 p. m.	8 p. m.	11 p. m.			Site.	Time, Amount, etc.
1896. Dec. 1-2...	889	101.	101.8	102.2	101.2	101.	....	101.4	102.2	Neck....	10 p. m., 3 c. c......
" 1-2...	890	....	....	102.6	101.4	101.4	....	102.1	102.6	"	10 p. m., 4 c. c......
" 1-2...	891	....	....	102.3	101.6	100.4	....	101.4	102.3	"	" ......
" 5....	892	102.4	101.8	99.	101.3	101.6	....	101.2	102.4	"	10 p. m., 4 c. c., No. 6
" 5....	893	104.	101.8	101.2	102.2	104.8	....	103.3	104.8	"	"
" 5....	894	101.8	102.2	99.8	101.3	100.	....	101.1	102.2	"	"
" 5....	895	102.	102.	101.	100.8	101.4	....	101.4+	102.	"	"
" 5....	896	102.4	101.8	99.8	100.5	101.	....	101.4	102.4	"	10 p. m., 4 c. c., No. 8
" 5....	897	101.7	101.9	100.	101.2	101.6	....	101.3	101.9	"	10 p. m., 5 c. c., No. 6
" 5....	898	102.6	102.7	98.2	103.3	101.	....	101.6	102.7	"	10 p. m., 4 c. c., No. 6
" 5....	899	102.4	102.3	99.	100.6	101.	....	101.1	102.4	"	"
" 5....	900	102.4	102.	102.	101.7	102.	....	102.+	102.4	"	"
" 5....	901	102.2	102.5	101.	101.5	101.2	....	101.7	102.5	"	"
" 5...	902	102.3	102.4	102.2	102.6	102.2	....	102.3	102.6	"	10 p. m., 4 c. c., No. 8
" 5....	903	101.2	102.4	101.	101.4	101.2	....	101.4	102.4	"	10 p. m., 5 c. c., No. 6
" 5....	904	101.2	101.8	100.	100.8	101.	....	101.—	101.8	"	10 p. m., 4 c. c., No. 6
" 5....	905	102.	102.2	101.	101.9	102.2	....	101.9—	102.2	"	10 p. m., 4 c. c., No. 8
" 5....	906	102.	102.5	101.2	102.4	102.	....	102.2+	105.5	"	"
" 5....	907	102.6	102.5	101.	101.5	101.8	....	101.9	102.6	"	"
" 5....	908	102.2	102.4	100.	101.3	101.4	....	101.5	102.4	"	10 p. m., 4 c. c., No. 6
" 5....	909	101.	101.	99.8	100.4	100.6	....	100.6	101.	"	10 p. m., 5 c. c., No. 8
" 5....	910	103.	102.9	100.9	101.3	102.4	....	102.1	103.	"	10 p. m., 4 c. c., No. 8
" 5....	911	102.6	102.	100.9	101.2	101.	....	101.5	102.6	"	"
" 5....	912	102.4	102.7	101.2	101.6	101.4	....	101.9	102.7	"	"
" 5....	913	102.4	102.	101.	101.5	101.9	....	101.8	102.4	"	"
" 5....	914	102.4	102.2	101.	101.2	101.2	....	101.6	102.4	"	10 p. m., 4 c. c., No. 6
" 5....	915	101.8	102.2	99.	101.3	101.2	....	101.1	102.2	"	10 p. m., 4 c. c., No. 8
" 5....	916	102.2	101.6	100.4	100.1	100.4	....	100.9	102.2	"	"
" 5....	917	102.	102.5	99.4	101.2	101.6	....	101.3+	102.5	"	"
" 5....	918	102.	101.7	100.4	101.	101.	....	101.2	102.	"	"
" 5....	919	102.	102.	101.	101.2	101.2	....	101.5	102.	"	"
" 5 ...	920	....	103.	103.2	103.6	102 4	....	103.1	103.6	"	"
" 7-8...	921	101.	101.5	102.	102.	100.5	....	101.4	102.	"	"
" 7-8...	†922	102.4	102.9	101.9	100.6	100.4	....	101.6+	102.9	"	"
" 7-8...	*923	102.2	102.7	102.6	103	101.6	....	102.4+	103.	"	"
" 7-8...	924	102.	101.7	100.	100.6	100.5	....	101.—	102.	"	"
" 7-8...	925	101.9	102.3	101.9	102.4	101.5	....	102.	102.+	"	"
" 7-8...	926	101.8	101.9	99.8	101.4	100.6	....	101.1	101.9	"	"
" 7-8...	927	102.4	102.8	102.	101.9	100.5	....	101.9+	102.8	"	"
" 7-8...	928	102.	102.3	101.9	103.	100.4	....	101.9+	103.	"	"
" 7-8...	929	101.4	101.2	101.2	101.6	100.6	....	101.2	101.6	"	"
" 7-8...	†930	101.	101.5	100.	100.6	100.6	....	100.9+	101.6	"	"
" 7-8...	931	102.	102.2	100.5	100.	100.8	....	101.3	102.2	"	"
" 7-8...	932	101.9	101.7	100.2	103.	101.5	....	101.7	103.	"	"
" 7-8...	933	101.2	100.5	100.4	102.	100.7	....	101.4	102.	"	"
" 7-8...	934	101.4	102.	100.	101.	100.5	....	101.—	102.	"	"
" 7-8...	935	102.	102.4	101.2	102.	101.1	....	101.7	102.4	"	10 p. m., 3 c. c., No. 8
" 7-8...	936	101.	101.6	101.	101.2	100.4	....	101.+	101.6	"	10 p. m., 4 c. c., No. 8
" 7-8...	937	102.4	102.8	102.2	102.9	102.	....	102.5—	102.9	"	"
" 7-8...	938	101.2	101.7	100.9	101.	100.9	....	101.1+	101.7	"	"
" 7-8...	939	100.	100.6	100.	100.6	100.1	....	100.3—	100.6	"	"
" 7-8...	940	101.2	101.6	99.9	101.4	100.6	....	100.9+	101.6	"	"
" 7-8...	941	101.1	102.	101.	100.2	99.5	....	100.7+	102.	"	"

TEMPERATURES.									
AFTER									
2 p.m.	5 p.m.	8 p.m.	11 p.m.	Average.	Maximum.	Interval between injections and rise of temperature above maximum normal.	Duration of Rise.	Amount of Rise.	REMARKS.
						Hrs.	Hrs.	Deg.	
101.4	....	....	....	101.9	102.6	12+	6+	.4	Negative.
102.3	....	....	....	102.1	102.6	..	..	..	"
102.2	....	....	....	101.9+	102.2	..	..	..	"
103.	....	....	....	102.6	103.	12+	6—	.6	"
100.7	....	....	....	101.2	101.6	..	..	..	"
100.8	....	....	....	101.9+	103.2	12+	3+	1.	"
104.3	105.6	....	....	105.4+	107.1	10—	9	5.1	Condemned; lgs.; mst. gl.
102.2	....	....	....	102.7—	102.5	12+	3—	.1	Negative.
104.5	104.5	....	....	105.1	106.2	10—	9	4.3	Condemned; lgs.; mst. gl.
105.	106.5	....	....	106.5—	107.8	10—	9	5.1	Condemned; lgs.; mst. gl.; liv.
99.4	....	....	....	100.5+	102.	..	..	..	Negative.
104.5	104.5	....	....	104.9+	107.	10—	9	4.6	Condemned; mst. gl.; liv.
103.6	....	....	....	105.5+	103.6	16—	6	1.1	Negative.
106.5	104.5	....	....	105.3+	106.5	10—	9	3.9	Condemned; lgs.; mst. gl.
103.9	104.4	....	....	105.	106.	10—	9	3.6	Condemned; mst. gl.; liv.
106.	105.6	....	....	105.5—	106.	10—	9	4.2	Condemned; lgs.; mst. gl.; liv.
107.3	105.7	....	....	105.6	107.3	10—	9	5.1	Condemned; l. lgs.; mst. gl.
103.2	....	....	....	103.2	103.6	10—	9	1.1	Negative.
103.6	103.6	....	....	105.1	107.2	10—	9	3.6	Condemned; l. lg.; mst. gl.
103.4	104.8	....	....	104.1+	105.3	10—	9	2.9	Condemned; s. int.; mst. gl.; mes. gl.; liv.
101.3	....	....	....	102.7+	104.1	10—	3	3.	Negative.
105.3	106.5	....	....	106.5+	107.6	10—	3	4.6	Condemned; lgs.; mst. gl.; liv.
102.3	....	....	....	102.8	103.7	12+	3+	1.1	Negative.
102.5	....	....	....	102.3+	102.5	..	..	..	"
102.2	....	....	....	102.0+	103.	10—	3—	.6	"
105.	104.5	....	....	105.6+	106.6	10—	9	4.2	Condemned; legs.; mst. gl.
103.5	104.8	....	....	104.8	105.5	10—	9	3.3	Condemned; lgs.; mst. gl.; liv.
103.3	....	....	....	100.+	104.6	13—	3	2.4	Negative.
106.1	105.7	....	....	105.8	107.6	10—	9	5.1	Condemned; mst. gl.
103.2	....	....	....	102.5	103.2	13—	6+	1.	Negative.
100.2	....	....	....	101.1+	101.8	..	..	..	"
102.4	....	....	....	103.	103.6	..	..	..	"
106.2	105.3	....	....	102.2+	106.2	13	7+	4.2	Condemned; mm. lc.; mst. and br. gl., lgs.; liv.
105.	....	....	....	102.2+	105.	16—	3	2.	Negative.
104.6	....	....	....	103.9+	104.6	10—	6+	1.6	Negative; all parts healthy.
106.2	105.	....	....	103.+	106.2	15+	7+	4.2	Condemned: mst. and br. gl.
106.	106.6	....	....	106.2+	106.8	10—	9+	4.4	Condemned; mst. and br. gl.; lgs.
106.	104.	....	....	103.9	106.	10—	9+	4.1	Condemned; hbd. lc. gl.; mst. and br. gl.; lgs.
104.	....	....	....	103.8+	104.7	12+	6+	1.9	Negative.
102.4	....	....	....	101.8	102.4	..	..	..	"
101.4	....	....	....	101.	101.4	..	..	..	"
104.	....	....	....	102.6+	104.	12+	6+	2.4	"
106.2	105.	....	....	105.3	106.4	10—	9+	4.2	Condemned; mst. and br. gl.; lgs.
106.	104.2	....	....	103.6	106.	12+	9+	3.	Condemned; hbd. lc. gl.; mst and br. gl.; lgs.; liv.
102.6	....	....	....	102.+	102.6	16—	3+	.6	Negative.
105.	103.3	....	....	103.5+	105.6	12+	9+	3.2	Condemned; mst. and br. gl.; lgs.; liv.
102.5	....	....	....	102.1+	102.5	16—	3—	.1	Negative.
101.6	....	....	....	101.4	101.6	..	..	..	"
105.2	104.7	....	....	105.5	106.5	10—	9+	3.6	Condemned; mst. and br. gl.; lgs.; tong.
104.2	104.	....	....	106.3+	105.3	10—	9+	3.6	Condemned; mst. and br. gl.; legs; spl.
100.2	....	....	....	100.1+	100.8	12+	3+	.2	Negative.
106.2	104.	....	....	106.2+	106.2	12+	7+	3.6	Condemned; mst. and br. gl.; liv.
103.8	....	....	....	102.7+	103.8	12+	6+	1.8	Negative.

DATE.	TAG No.	TEMPERATURES.						Average.	Maximum.	TUBERCULIN INJECTION.	
		BEFORE									
		8 a. m.	11 a. m.	2 p. m.	5 p. m.	8 p. m.	11 p. m.			Site.	Time, Amount, etc.
1896. Dec. 7-8...	942	100.6	101.2	101.4	100.2	99.6	....	100.6	101.4	Neck....	10 p. m., 4 c. c., No. 8
" 7-8...	943	100.9	101.7	100.	100.6	100.	....	100.6+	101.7	"	"
" 7-8...	944	101.	101.8	101.	100.2	97.7	....	100.7+	101.8	"	"
" 7-8...	945	101.4	102.	100.4	100.8	100.	....	100.9+	102.	"	"
" 7-8...	946	101.6	101.3	99.	100.2	101.6	....	100.7+	101.6	"	"
" 7-8...	947	100.	101.3	100.6	100.9	100.4	...	100.6+	101.3	"	"
" 7-8...	948	101.	101.8	102	101.	100.8	....	101.3+	102.	"	10 p. m., 3 c. c., No. 10
" 7-8...	949	100.9	101.7	101.8	101.8	100.9	....	101.4	101.8	"	"
" 7-8...	950	102.	102.5	102.	103.	102.9	....	102.5	103.	" ...	"
" 7-8...	951	102.	102.4	102.2	102.2	101.	....	102.—	102.4	"	"
" 7-8...	952	101.4	101.8	102.2	102.4	101.2	....	101.8	102.4	"	"
" 10-11.	953	101.2	103.	102.	101.8	101.	....	101.8	103.	"	10 p. m., 4 c.c., No. 10
" 10-11.	954	101.9	103.	102.5	101.4	101.2	....	102.	103.	"	"
" 10-11.	955	101.9	102.4	102.2	102.	101.3	....	102.	102.4	"	"
" 10-11.	956	101.6	103.	101.6	101.	101.	....	101.6	103.	"	"
" 10-11.	957	101.2	103.	103.	102.6	101.7	....	102.3	103.	"	"
" 10-11.	958	101.9	102.9	101.8	101.2	101.4	....	101.8+	102.9	"	"
" 10-11.	959	102.4	103.4	101.	102.	101.6	....	102.1—	103.4	"	"
" 10-11.	960	101.2	102.4	102.	101.	101.3	....	101.6+	102.4	"	"
" 10-11.	961	101.8	103.	102.4	101.	101.2	....	102.	103.	"	"
" 10-11.	962	102.2	103.	102.9	102.2	102.3	....	102.5	103.	"	"
" 10-11.	963	100.9	102.6	102.	102.	100.7	....	101.5	102.6	"	"
" 10-11.	964	101.2	102.4	102.	101.2	101.4	....	101.8	102.4	"	"
" 10-11.	965	100.2	101.9	101.6	101.4	101.	....	101.3—	101.9	"	10 p. m., 3 c. c......
" 10-11.	966	101.4	102.9	101.9	101.9	101.2	....	101.9	102.9	"	" ......
" 10-11.	967	101.4	102.2	102.2	102.	101.4	....	101.6	102.2	"	" ......
" 10-11.	968	101.4	102.2	101.8	101.4	101.	....	101.6	102.2	"	10 p. m., 4 c. c......
" 10-11.	969	101.6	102.2	101.6	101.	101.1	....	101.5	102.2	"	" ......
" 10-11.	970	101.	101.4	101.4	100.2	99.3	....	100.7	101.4	"	" ......
" 10-11.	971	101.	101.6	102.	101.4	101.	....	101.4	102.	"	10 p. m., 3 c. c......
" 10-11.	972	101.	103.	102.4	101.6	101.	....	101.8	103.	"	10 p. m., 4 c. c......
" 18-19.	973	101.	101.2	101.	100.8	100.2	....	100.8+	101.2	"	10 p. m., 4 c. c.. No. 14
" 18-19.	974	102.	101.8	101.4	101.3	100.7	....	101.4+	102.	"	"
" 18-19.	975	101.9	102.	101.4	101.5	100.	....	101.4—	102.	"	"
" 18-19.	976	102.	101.7	101.3	101.1	100.6	....	101.3+	102.	"	"
" 18.19.	977	101.	100.	99.4	100.8	99.8	....	100.2	101.	"	"
" 18-19.	978	101.9	101.5	102.	101.6	100.8	....	101.6	102.	"	"
" 18-19.	979	101.7	101.5	101.2	101.4	100.4	....	101.2+	101.7	"	10 p. m., 4 c.c., No. 13
" 18-19.	980	102.6	102.1	101.7	101.4	100.5	....	101.7—	102.6	"	"
" 18-19.	981	102.	101.6	101.8	101.5	101.1	....	101.6	102.	"	12 p. m., 4 c.c., No. 13
" 18-19.	982	102.	101.5	101.8	101.	100.9	....	101.4—	102.	"	10 p. m., 4 c.c., No. 13
" 18-19.	983	101.5	101.5	101.2	101.3	100.2	....	101.4+	101.5	"	"
" 18-19.	984	102.3	101.5	101.5	101.1	100.7	....	101.4—	102.3	"	"
" 18-19.	985	100.9	99.2	101.4	100.	100.4	....	100.4—	101.4	"	"
" 18-19.	986	100.9	100.9	100.6	101.	100.	....	100.7—	100.9	"	"
" 18-19.	987	101.6	101.5	100.8	100.6	100.3	....	101.—	101.6	"	"
" 18-19.	988	101.4	101.	101.1	100.4	100.7	....	100.9	101.4	"	"
" 18-19.	989	102.4	102.2	101.6	161.5	100.5	....	101.7—	102.4	"	"
" 18-19.	990	102.4	102.	101.9	100.8	100.8	....	101.6—	102.4	"	"
" 18-19.	991	101.8	101.6	100.5	101.2	100.5	....	101.4	101.8	"	"
" 18-19.	992	101.5	100.2	101.8	100.3	100.4	....	100.8+	101.8	"	"
" 18-19.	993	101.8	101.5	101.7	101.8	101.4	....	101.6+	101.8	"	"
" 18-19.	994	102.2	102.2	101.8	101.7	100.7	....	101.7+	102.2	"	"
" 18-19.	995	101.6	101.5	101.7	101.2	100.8	....	101.4—	101.7	"	"
" 18-19.	996	102.1	101.	101.7	101.	100.3	....	101.2+	102.1	"	"
" 18-19.	997	102.2	101.4	101.6	101.4	101.4	....	101.6	102.2	"	"
" 18-19.	998	101.8	101.9	102.2	101.6	100.5	....	101.6—	102.	"	"
" 18-19.	999	101.8	101.3	101.3	100.1	100.6	....	101+	101.8	"	"
" 18-19.	1000	101.8	100.7	100.	101.6	101.	....	101.6+	102.	"	"
" 7-8...	800	....	102.2	101.2	....	101.8	....	101.7+	102.2	"	10 p. m., 5 c.c., No. 9
" 7-8...	1001	....	100.1	99.5	....	101.6	....	100.9—	101.6	"	"

TEMPERATURES.				Average.	Maximum.	Interval between injections and rise of temperature above maximum normal.	Duration of Rise.	Amount of Rise.	REMARKS.
AFTER									
2 p.m.	5 p.m.	8 p.m.	11 p.m.			Hrs.	Hrs.	Deg.	
102.	....	....	....	101.3	102.	16—	3+	.6	Negative.
105.9	104.2	....	....	104.5+	105.9	10—	9+	4.2	Condemned; mst. and br. gl.; lgs.; liv.
101.8	....	....	....	101.2	101.8	..	..	..	Negative.
106.	106.	....	....	104.8+	106.8	10—	9+	4.8	Condemned; mst. and br. gl.; lgs.; liv.
106.6	105.	....	....	104.2	106.6	12+	7+	.5	Condemned; mst. and br. gl.; lgs.; liv.
105.4	104.8	....	....	103.3+	105.4	12+	9+	4.1	Condemned; mst. gl.; liv.
102.	....	....	....	101.3	102.	..	..	..	Negative.
102.6	....	....	....	101.4—	102.6	16—	..	.8	"
102.	....	....	....	101.7	102.3	..	..	.7	"
106.9	107.	....	....	106.7—	107.	10—	9	4.6	Condemned; mst. gl.; lgs. liv.
106.5	106.6	....	....	106.5	106.6	10—	9+	4.2	Condemned; mst. gl.; lgs.; liv.
101.4	....	....	....	101.7+	102.8	..	..	.2	Normal.
101.4	....	....	....	101.8+	102.5	..	..	.5	"
100.6	....	....	....	101.4+	102.2	..	..	.2	"
102.2	....	....	....	102.	102.4	..	..	.6	"
102.5	....	....	....	102.3+	103.	..	..	..	"
101.2	....	....	....	102.2—	103.	10—	3—	.1	"
101.4	....	....	....	102.2	103.2	..	..	.2	"
101.4	....	....	....	101.5+	101.8	..	..	.6	"
101.5	....	....	....	101.8	102.5	..	..	.5	"
102.8	....	....	....	102.4+	102.8	..	..	.2	"
101.7	....	....	....	102.2—	103.1	..	..	.5	"
102.6	....	....	....	102.3	102.6	16—	..	.2	"
102.5	....	....	....	102.+	102.6	13—	..	.7	"
101.9	....	....	....	102.6+	104.	13—	..	1.1	"
102.	....	....	....	102.+	102.6	13—	3—	.4	"
101.6	....	....	....	102.3+	103.6	13—	3—	1.4	"
100.6	....	....	....	101.5	102.4	13—	3—	.2	"
102.2	....	....	....	101.9	102.5	13—	3—	1.1	"
101.9	....	....	....	101.8	102.5	13—	3—	.5	"
101.5	....	....	....	101.6	102.2	..	..	.8	"
100.8	....	....	....	100.2+	100.8	..	..	..	Negative.
100.6	....	....	....	101.2	101.5	..	..	..	"
100.8	....	....	....	100.8—	100.9	..	..	..	"
100.	....	....	....	99.8	100.	..	..	..	"
100.4	....	....	....	99.5	100.4	..	..	..	"
100.1	....	....	....	100.8+	101.2	..	..	..	"
105.2	103.9	....	....	103.5+	105.2	13—	6+	3.5	Condemned; l. lg.; liv.
101.	....	....	....	100.9+	101.2	..	..	..	Negative.
104.4	104.1	....	....	104.	106.	8	11+	4.	Condemned; mst. and br. gl.; lgs.
102.	....	....	....	101.5	102.	..	..	..	Negative.
100.9	....	....	....	101.1+	101.6	10	..	.1	"
101.3	....	....	....	100.7—	101.3	..	..	..	"
99.5	....	....	....	100.3	100.9	..	..	..	"
101.2	....	....	....	100.5	101.2	16—	..	.3	"
101.5	....	....	....	101.3+	101.5	..	..	..	"
100.5	....	....	....	100.3+	100.5	..	..	..	"
101.4	....	....	....	101.3+	101.4	..	..	..	"
101.6	....	....	....	100.9—	101.6	..	..	..	"
101.8	....	....	....	100.9+	101.8	..	..	..	"
101.4	....	....	....	100.5	101.4	..	..	..	"
101.4	....	....	....	101.1+	101.4	..	..	..	"
102.2	....	....	....	101.9—	102.2	..	..	..	"
101.3	....	....	....	101—	101.3	..	..	..	"
101.2	....	....	....	101.2—	101.5	..	..	..	"
101.9	....	....	...	101.6	101.9	..	..	..	"
101.7	....	....	....	101.3+	101.7	..	..	..	"
101.	....	....	....	101.1	101.3	..	..	..	"
101.6	....	....	....	101.2+	101.6	..	..	..	"
99.7	....	....	....	99.7+	100.0	..	..	..	"
99.9	...	....	....	100.	101.1	..	..	..	"

DATE.	TAG No.	TEMPERATURES.						Average.	Maximum.	TUBERCULIN INJECTION.	
		BEFORE									
		8 a.m.	11 a.m.	2 p.m.	5 p.m.	8 p.m.	11 p.m.			Site.	Time, Amount, etc.
1890.											
Dec. 7-8...	1002	....	100.1	101.6	....	100.9	....	100.9—	101.6	Neck	10 p.m., 5 c.c. No. 9.
" 7-8...	1003	....	100.8	100.8	....	100.8	....	100.8	100.8	"	"
" 7-8...	1004	....	101.—	101.7	....	101.5	....	101.4	101.7	" ..	"
" 7-8...	1005	....	100.8	101.4	....	99.9	....	100.4	101.4	"	"
" 7-8...	1006	....	100.2	100.8	....	100.8	....	100.3	100.8	"	"
" 7-8...	1007	....	100.	101.8	....	101.4	....	101+	101.8	"	"
" 7-8...	1008	....	100.6	100.9	....	100.6	....	100.7	100.9	"	"
" 7-8...	1009	....	99.7	100.6	....	101.5	....	100.6	101.5	"	"
" 7-8...	1010	....	99.9	100.9	....	101.6	....	100.6	101.6	"	"
" 7-8...	1011	....	100.4	101.2	....	100.6	....	100.7+	101.2	"	"
" 7-8...	1012	....	100.	101.5	....	101.—	....	100.8+	101.5	"	"
" 7-8...	1013	....	100.2	101.5	....	100.5	....	100.7+	101.5	"	"
" 7-8...	1014	....	101.2	101.4	....	101.1	....	101.2+	101.4	"	"
" 7-8...	1015	....	100.4	100.7	....	99.8	....	100.3	100.7	"	"
" 7-8...	1016	....	100.5	100.6	....	100.8	....	100.6+	100.8	"	"
" 7-8...	1017	....	100.1	100.9	....	100.9	....	100.6+	100.9	"	"
" 7-8...	1018	....	100.2	101.3	....	100.5	....	100.7—	101.3	"	"
" 7-8...	1019	....	100.2	101.—	....	100.7	....	100.6+	101.—	"	10 p.m., 5 c.c., No. 5
" 7-8...	1020	....	100.—	101.3	....	100.8	....	100.7	101.3	"	10 p.m., 4 c.c., No. 5
" 7-8...	1021	....	100.5	100.5	....	100.6	....	100.5+	100.6	"	"
" 7-8...	1022	....	100.4	101.4	....	100.7	....	100.8+	101.4	"	10 p.m., 5 c.c., No. 5
" 7-8...	1023	....	100.4	101.3	....	100.7	....	100.8	101.3	"	"
" 15-16.	1024	100.9	100.5	100.5	100.1	100.2	....	100.4+	100.9	"	10 p.m., 4 c.c., No. 10
" 15-16.	1025	101.8	101.6	100.6	101.1	100.6	....	101.1+	101.8	"	10 p.m., 3½ c.c. No. 10
" 15-16.	1026	101.6	101.7	102.	101.7	101.	....	101.6	102.	"	10 p.m., 4 c.c., No. 10
" 15-16.	1027	100.2	100.4	101.6	101.	101.	....	100.8+	101.6	"	"
" 15-16.	1028	100.1	101.7	101.5	101.5	101.4	....	101.2+	101.7	"	"
" 15-16.	1029	100.9	100.6	99.8	101.	100.6	....	100.6—	101.	"	"
" 15-16.	1030	100.4	100.	101.4	99.8	100.	....	100.3+	101.4	"	"
" 15-16.	1031	100.8	101.	101.4	101.	100.8	....	101.0	101.4	"	"
" 15-16.	†1032	100.5	100.8	101.3	100.6	100.	....	100.6+	101.3	"	"
" 15-16.	†1033	101.2	101.4	101.4	101.5	101.	....	101.3	101.5	"	"
" 15-16.	1034	101.2	101.4	101.2	101.2	100.5	....	101.1	101.4	"	"
" 15-16.	1035	101.3	100.8	101.3	102.	100.8	....	101.2+	102.	"	"
" 15-16.	1036	101.5	101.4	101.4	101.6	101.2	....	101.4+	101.6	"	"
" 15-16.	1037	101.1	101.4	101.4	101.5	101.	....	101.3—	101.5	"	"
" 15-16.	1038	102.5	102.	102.	102.4	100.6	....	101.9	102.5	"	"
" 15-16.	1039	99.	100.2	100.8	100.	100.4	....	100.1—	100.8	" ...	"
" 15-16.	1040	100.2	100.2	100.1	101.	100.	....	100.3	101.	"	"
" 15-16.	1041	101.2	101.5	101.2	101.4	100.8	....	101.2+	101.5	"	"
" 15-16.	1042	100.8	101.	101.2	100.9	100.6	....	100.9	101.2	"	"
" 15-16.	1043	100.8	100.	101.9	101.4	101.4	....	101.1	101.9	"	10 p.m. 3.5 c.c.....
" 15-16.	1044	101.8	101.3	101.2	101.	100.4	....	101.1+	101.8	"	10 p.m. 4 c.c......
" 15-16.	1045	100.8	101.	101.4	101.4	102.2	....	101.3+	102.2	"	" ......
" 15-16.	1046	101.8	100.4	101.2	101.	101.6	....	101.5+	101.8	"	" ......
" 15-16.	†1047	102.2	100.8	102.2	101.6	102.	....	101.7+	102.2	"	10 p.m. 3 c.c......
" 15-16.	1048	102.4	101.8	101.7	101.8	101.6	....	101.8+	102.4	"	" ......
" 15-16.	1049	100.7	99.8	100.	99.2	101.2	....	100.1+	101.2	"	10 p.m. 4 c.c......
" 15-16.	1050	102.5	102.4	101.4	100.	100.5	....	101.5+	102.5	"	" ......
" 15-16.	1051	102.3	102.4	101.3	101.2	100.4	....	101.5+	102.4	"	" ......
" 15-16.	1052	101.2	101.6	100.3	100.4	101.7	....	101.4	101.7	"	10 p.m. 3 c.c......
" 15-16.	1053	101.4	101.9	100.5	100.7	101.	....	101.1	101.9	"	" ......
" 15-16.	1054	101.8	100.5	100.8	100.8	99.9	....	100.6	101.3	"	10 p.m. 4 c.c. No. 10
" 15-16.	1055	101.5	101.7	101.5	100.9	100.4	....	101.2	101.7	"	"
" 15-16.	1056	101.8	101.9	102.1	101.	101.7	....	101.7	102.1	"	"
" 15-16.	1057	100.8	100.7	99.8	100.8	100.7	....	100.6—	100.8	"	"

TEMPERATURES.									
AFTER									
2 p. m.	5 p. m.	8 p. m.	11 p. m.	Average.	Maximum.	Interval between injections and rise of temperature above maximum normal.	Duration of Rise.	Amount of Rise.	REMARKS.
						Hrs.	Hrs.	Deg.	
100.9	....	....	....	100.5+	100.9	..	..	..	Negative.
100.6	....	....	....	100.2	100.6	..	..	..	"
100.6	....	....	....	100.6—	100.6	..	..	.	"
100.2	...	....	....	99.9	100.5	..	..	..	"
100.—	....	....	....	99.3	100.	..	..	..	"
100.2	...	....	....	100—	100.2	..	..	..	"
100.5	....	....	....	100.1	100.5	..	..	..	"
100.9	....	....	....	100.7	100.9	..	..	..	"
100.6	....	....	....	100.2+	100.6	..	..	..	"
100.3	....	....	....	100.1+	100.5	..	..	..	"
100.9	....	....	....	100.7+	101 1	..	..	..	"
100.6	....	....	....	100.4+	101.2	..	..	..	"
100.1	....	....	....	100.8	101.1	..	..	..	"
99.7	....	....	....	99.9	100.4	..	..	..	"
100.—	....	....	....	100.—	100.	..	..	..	"
100.1	....	....	....	100.3	100.7	..	..	..	"
100.5	....	....	...	100.3+	100.5	..	..	..	"
99.7	....	....	....	100.2+	101.7	10—	10+	.7	"
100.—	....	....	....	99.9—	100.—	..	..	..	"
100.4	....	....	....	100.1—	100.4	..	..	..	"
100.5	....	....	....	100.4—	100.5	..	..	..	"
100.9	....	....	....	100.3	100.9	..	..	..	"
103.5	104.2	....	....	104.3+	105.6	10—	9+	4.7	Condemned; abd. lc. gl.; mst. and br. gl.; lgs.
103.6	101.8	....	....	103.4	105.2	10—	3	3.4	Negative.
100.	....	....	....	101.8—	101.8	..	..	—.2	"
104.4	104.	....	....	104.4—	105.8	10—	9+	4.2	Condemned; mst. and br. gl.; l. lg; liv.
104.4	104.4	....	....	103.8	104.4	10—	9+	2.7	Negative.
103.4	103.2	....	....	103.8+	104.9	10—	9+	3.9	Condemned: lgs.; liv.; diaph. subm. gl.; mst. and br. gl.
105.4	105.8	....	....	105.5—	106.2	10—	9+	4.8	Condemned; mst. and br. gl.; r. lg.; liv.
100.7	....	....	....	100.7	101 4	..	..	..	Negative.
103.1	102.5	....	....	102.8+	104.2	10—	9+	2.9	"
103.6	102.6	....	....	102.8+	104.8	13—	3	3.3	"
103.	101.	....	....	101.3+	103.2	13—	3	1.8	"
104.6	103.5	....	....	105.	107.	10—	9+	5.	Condemned; mst. gl.; liv.; mm. sc.
105.	106.2	....	....	104.7+	106.2	10—	9+	4.6	Condemned; int.
106.4	105.2	....	....	104.7+	106.4	10—	9+	4.9	Condemned; mst. and br. gl.; lgs.; liv.
107.2	106.	....	....	105.+	107.2	13—	9+	4.7	Condemned; mst. and br. gl.; lgs.; liv.
99.6	....	....	....	99.8+	101.	13—	13	.2	Negative.
101.6	....	....	....	100.8+	101.6	16—	..	.6	"
103.6	101.8	....	....	104.+	106.4	10—	9	4.9	Condemned; mm. lc.; mst and br. gl.; liv.
105.8	106.2	....	....	105.5+	106.3	10—	9+	5.1	Condemned; mst. and br. gl.; lgs.; liv.
105.1	103.8	....	....	105.2+	106.5	10—	19	4.6	Condemned; mst. and br gl.; lgs.; liv.
101.6	....	....	....	101.6+	101.8	..	..	..	Negative.
101.3	....	...	....	101.7+	102.2	..	..	..	"
103.7	....	....	....	103.4	103.7	10—	16—	1.9	"
105.5	104.5	....	....	102.2+	105.5	10—	19	3.3	"
104.4	104.	....	....	103.1+	104.4	13	9	2.	"
102.7	....	....	....	101.5	102.7	10—	16	1.5	"
105.9	105.	....	....	105.1+	105.9	10—	19+	3.4	Condemned; mst. and br. gl.; l. lg.; liv.
104.6	103.5	....	....	101.2	104.6	10—	19	2.2	Negative.
102.9	....	....	....	101.2+	102.9	16—	3	1.2	"
104.	....	...	....	103.6+	104.	10—	16	2.1	"
100.9	....	....	....	100.8	101.	..	..	..	"
101.5	....	....	....	100.8+	101.5	..	..	..	"
102.	....	....	....	101.6	102.	..	..	..	"
101.3	....	....	....	101.+	101.4	16—	6	.6	"

Date.	Tag No.	Temperatures.						Average.	Maximum.	Tuberculin Injection.	
		before									
		8 a.m.	11 a.m.	2 p.m.	5 p.m.	8 p.m.	11 p.m.			Site.	Time, Amount, etc.
1896.											
Dec. 15-16.	1058	102.	102.5	102.7	102.2	101.9	....	102.3—	102.7	Neck....	10 p.m., 4 c c., No. 10
“ 15-16.	1059	101.3	100.8	101.5	100.7	100.5	....	101.	101.5	“	“
“ 15-16.	1060	100.8	102.2	101.	100.4	99.8	....	100.8+	102.2	“	“
“ 18-19.	1061	101.7	101.7	101.3	101.1	101.3	....	101.4+	101.7	“	10.25 p.m. 4 c.c. No. 13.......
“ 18-19.	1062	101.1	101.3	100.8	100.8	101.7	....	101.1+	101.7	“	“
“ 18-19.	1063	101.2	101.2	101.6	101.1	101.4	....	101.3	101.6	“	“
“ 18-19.	1064	101.4	101.4	101.5	100.9	101.3	....	101.3	101.5	“	“
“ 18-19.	1065	100.6	101.2	101.4	100.7	101.4	....	101.1—	101.4	“	“
“ 18-19.	1066	99.4	101.2	100.9	100.7	101.	....	100.6+	101.2	“	“
“ 18-19.	1067	101.5	101.6	101.3	101.7	101.6	....	101.4+	101.7	“	“
“ 18-19.	1068	102.1	101.1	101.2	101.	101.4	....	101.4—	102.1	“	“
“ 18-19.	1069	101.3	101.—	101.2	101.3	101.3	....	101.2+	101.3	“	“
“ 18-19.	1070	101.2	101.6	101.1	100.8	101.	....	101.1+	101.6	“	“
“ 18-19.	1071	101.6	101.	101.4	101.	101.8	....	101.4—	101.8	“	“
“ 18-19.	1072	101.5	102.1	101.7	101.4	101.5	....	101.6+	102.1	“	10.25 p.m. 5 c.c. No. 13.......
“ 18-19.	1073	....	101.2	101.	101.2	100.6	....	101.	101.2	“	10.40 p.m. 4 c.c. No. 14.......
“ 18-19.	1074	....	101.6	101.9	101.4	101.2	....	101.5+	101.9	“	“
“ 18-19.	1075	....	100.4	101.4	101.	101.2	....	101.+	101.4	“	“
“ 18-19.	1076	....	100.4	101.4	101.2	101.2	....	101.+	101.4	“	“
“ 18-19.	1077	....	100.	100.6	100.	100.	....	101.+	100.6	“	“
“ 18-19.	1078	....	100.	101.2	100.	100.9	....	100.5+	101.2	“	“
“ 18-19.	1079	....	100.9	101.4	101.	100.6	....	101.—	101.4	“	“
“ 18-19.	1080	....	100.6	101.8	101.	100.2	....	100.9	101.8	“	“
“ 18-19.	1081	....	102.	102.2	101.9	101.6	....	101.9+	102.2	“	“
“ 18-19.	1082	....	101.6	102.	102.	101.	....	101.6	102.	“	“
“ 18-19.	1083	....	101.	102.	101.9	101.8	....	101.7—	101.2	“	“
“ 18-19.	1084	....	100.9	102.	101.4	101.	....	101.3+	102.	“	“
“ 18-19.	1085	....	101.2	102.	101.4	101.	....	101.4	102.	“	“
“ 18-19.	1086	....	100.2	101.9	101.	100.2	....	100.8	101.9	“	“
“ 18-19.	1087	....	101.6	101.4	101.2	101.2	....	101.3+	101.6	“	“
“ 18-19.	1088	....	100.9	99.2	99.4	100.	....	99.9	100.9	“	“
“ 18-19.	1089	....	101.2	101.6	100.2	100.2	....	100.8	101.6	“	“
“ 18-19.	1090	....	101.9	102.2	101.9	100.4	....	101.6	102.2	“	“
“ 18-19.	1091	....	103.4	102.9	102.	102.	....	102.6	103.4	“	“
“ 18-19.	1092	....	102.4	102.2	101.9	101.4	....	102.—	102.4	“	“
“ 18-19.	1093	....	102.2	101.9	101.6	101.2	....	101.7+	102.2	“	“
“ 18-19.	1094	....	101.2	101.6	101.2	101.	....	101.2+	101.6	“	“
“ 18-19.	1095	101.6	101.4	101.9	101.	....	....	101.5—	101.9	“	11 p.m., 3 c.c., No. 13
“ 22-23.	1096	....	101.4	3.30 pm 101.	....	100.8	....	101.1	101.4	“ ...	9 p.m., 4 c.c.......
“ 22-23.	1097	....	100.8	100.6	....	101.	....	100.8	101.	“	“
“ 22-23.	1098	....	101.4	101.1	....	101.2	....	101.2+	101.4	“	“
“ 22-23.	1099	....	101.6	101.	....	100.2	....	100.9+	101.6	“	“
“ 22-23.	1100	....	101.6	101.9	....	101.6	....	101.7	101.9	“	“
“ 22-23.	1101	....	101.5	102.5	....	101.6	....	101.9	102.5	“	9 p.m., 3 c.c. .....
“ 22-23.	1102	....	101.7	101.5	....	101.	....	101.4	101.7	“	“
“ 22-23.	1201	100.4	101.1	2 p.m. 101.4	101.	99.9	....	100.8	101.4	“	10 p.m., 4 c.c., No. 14
“ 22-23.	1202	100.3	100.6	101.1	101.1	100.3	....	100.7—	101.1	“	“
“ 22-23.	1203	100.5	100.9	99.6	100.8	100.2	....	100.4	100.8	“	“
“ 22-23.	1204	100.2	101.4	101.2	100.2	101.2	....	100.8+	101.4	“	“
“ 22-23.	1205	101.2	100.8	100.8	100.5	100.6	....	100.8—	101.2	“	“
“ 22-23.	1206	98.	100.3	99.6	100.7	98.6	....	99.2+	100.7	“	“
“ 22-23.	1207	99.9	100.6	100.4	100.6	100.	....	100.3	100.6	“	“
“ 22-23.	1208	100.3	100.6	100.8	99.8	99.	....	100.1	100.8	“	“
“ 22-23.	1209	100.1	99.5	100.6	100.8	99.9	....	100.4—	100.8	“	“
“ 22-23.	1210	98.6	100.7	101.2	100.4	100.7	....	100.3+	101.2	“	“

Temperatures.					Average.	Maximum.	Interval between injections and rise of temperature above maximum normal.	Duration of Rise.	Amount of Rise.	Remarks.
After										
11 a.m.	2 p.m.	5 p.m.	8 p.m.	11 p.m.						
							Hrs.	Hrs.	Deg.	
102.4	102.8	....	....	....	102.5—	102.8	16—	3	.1	Negative.
100.8	102.2	....	....	....	101.5—	102.2	13—	3	.7	“
101.3	101.5	....	....	....	101.3—	101.5	..	..	..	“
102.6	101.9	....	....	....	102.	102.6	13—	6	.9	“
101.4	101.3	....	....	....	101.4	101.5	..	..	..	“
100.3	101.	....	....	....	100.6+	100.8	..	..	..	“
101.4	100.9	....	....	....	101.—	101.4	..	..	..	“
101.2	101.2	....	....	....	101.3—	101.4	..	..	..	“
100.4	101.3	....	....	....	100.9+	101.3	13+	3	.1	“
101.2	101.3	....	....	....	101.3+	101.5	..	..	..	“
101.6	101.2	....	....	....	101.2—	101.6	..	..	..	“
104.6	104.3	103.6	....	....	104.4—	105.	8'	11+	3.7	Condemned; mst. and br.; lgs.
101.6	100.9	....	....	....	101.2	101.6	..	..	..	Negative.
101.9	101.4	....	....	....	101.6—	101.9	13—	3—	.1	“
101.6	101.2	....	....	....	101.3	101.6	..	..	..	“
100.4	101.2	....	....	....	100.9	101.2	..	..	..	“
101.2	100.6	....	....	....	100.7+	101.2	..	..	..	“
101.8	101.4	....	....	....	101.3+	101.8	13—	6	.4	“
101.	100.4	....	....	....	100.8	101.	..	..	..	“
98.5	100.2	....	....	....	99.2	100.2	..	..	..	“
101.	101.4	....	....	....	101.1+	101.4	13—	3	.2	“
101.2	101.4	....	....	....	101.1+	101.4	..	..	..	“
101.	100.6	....	....	....	100.7—	101.	..	..	..	“
100.8	101.4	....	....	....	101.3+	101.8	..	..	..	“
102.	101.	....	....	....	101.5—	102.	..	..	..	“
101.9	102.4	....	....	....	101.7	102.4	10—	13	1.2	“
104.9	106.2	106.2	....	....	104.9+	106.2	9+	9+	4.2	Condemned; liv.; mst. and br. gl.; pl.; lgs.
101.8	101.	....	....	....	101.3—	101.8	..	..	..	Negative.
101.4	101.2	....	....	....	100.9—	101.4	..	..	..	“
101.	101.	....	....	....	100.8	101.—	..	..	..	“
101.	102.	....	....	....	100.7—	102.	13—	3—	1.1	“
101.4	100.	....	....	....	100.8	101.4	..	..	..	“
101.6	101.4	....	....	....	101.1—	101.6	..	..	..	“
102.8	102.2	....	....	....	102.3+	102.8	..	..	..	“
102.9	101.	....	....	....	102.+	102.9	13—	3	.5	“
101.2	100.6	....	....	....	100.7+	101.2	..	..	..	“
101.2	100.9	....	....	....	101.+	101.2	..	..	..	“
101.	101.8	....	....	....	101.3—	101.8	..	..	..	“
100.7	191.1	....	....	....	100.9	101.1	..	..	..	“
105.2	105.4	....	....	....	105.1	105.4	11+	6+	4.6	Condemned; mst. and br. gl.; l. lg.
104.2	105.1	....	....	....	103.9—	105.1	11+	6+	3.7	Condemned; mst. and br. gl.; lgs. mm. lc.
105.8	105.1	....	....	....	105.2+	105.8	11+	6+	4.2	Condemned; mm. lc.; mst. and br. gl.; r. lg.
104.7	102.2	....	....	....	104.+	105.2	11+	6+	3.3	Condemned; mm. lc.; mst and br. gl.; pl. l. lg.
101.8	101.8	....	....	....	101.6	101.8	..	..	..	Negative.
101.	101.8	....	....	....	101.2	101.8	14	3	.1	“
101.4	101.6	....	....	....	101.3+	101.6	16—	6	.2	“
99.8	99.8	....	....	....	99.8+	99.9	..	..	..	“
100.6	100.7	....	....	....	100.7	100.8	..	..	..	“
101.3	99.8	....	....	....	100.6+	101.3	..	..	..	“
101.8	104.7	105.	....	....	103.3+	105.	14	6+	3.8	Condemned; mst. and br. gl.; lgs.
99.8	99.4	....	....	....	99.5—	99.8	..	..	..	Negative.
100.9	101.5	....	....	....	100.8	101.5	10—	6	.9	“
104.9	107.6	107.2	....	....	106+	107.6	8	11+	6.8	Condemned; mst. and br gl.; lgs.; liv.
100.6	101.6	....	....	....	100.8+	101.6	13	3	.8	Negative.
100.5	101.2	....	....	....	100.6—	101.2	..	..	..	“

DATE.	TAG No.	TEMPERATURES.								TUBERCULIN INJECTION.	
		BEFORE									
		8 a. m.	11 a. m.	2 p. m.	5 p. m.	8 p. m.	11 p. m.	Average.	Maximum.	Site.	Time, Amount, etc.
1896.											
Dec. 22–23.	1211	100.8	101.	101.4	100.6	101.	....	101.—	101.4	Neck....	10 p.m., 4 c.c., No. 14
" 22–23.	1212	100.8	100.8	101.	100.3	100.8	....	100.7+	101.	"	"
" 22–23.	1213	101.4	101.5	101.5	101.6	101.	....	101.4	101.6	"	"
" 22–23.	1214	100.7	101.	100.8	99.6	100.5	....	100.5+	101.6	"	"
" 22–23.	1215	99.7	100.9	100.4	99.6	100.3	....	100.2—	100.9	"	"
" 22–23.	1216	100.	100.4	100.8	100.6	100.2	....	100.4	100.8	"	"
" 22–23.	1217	100.3	100.7	100.5	101.1	100.7	....	100.7—	101.1	"	"
" 22–23.	1218	100.1	100.	100.6	100.3	100.4	....	100.3—	100.6	"	"
" 22–23.	‡1219	101.2	101.5	102.8	102.7	102.3	....	102.1	102.8	"	"
" 22–23.	1220	100.4	100.8	101.	101.8	100.4	....	100.9—	101.8	"	"
" 22–23.	1221	102.2	101.8	101.8	101.4	102.	....	101.8	102.	"	"
" 22–23.	1222	102.2	101.2	101.	100.5	100.4	....	101+	102.	"	"

NOTE 1.—The following abbreviations have been used in describing diseased parts, as found upon autop.... os

Bn.—Brain.	Kid.—Kidneys.
Lg.—Lung.	Spl.—Spleen.
L.—Left.	Tong.—Tongue.
R.—Right.	Thor.—Thorax.
Liv.—Liver.	Omt.—Omentum.
Lgs.—Lungs.	Abd. cav.—Abdominal cavity.
Pl.—Pleura.	

NOTE 2.—Whenever this * appears in connection with the tag number of a cow, it indicates that such a the Department, and the condition of the different parts and organs examined and reported upon; such results are

NOTE 3.—All cows marked with this † are to be again tested with tuberculin.

‡ Cow Tag No. 1219 aborted 6 days before test and withheld the fœtal membranes.

TEMPERATURES.					Average.	Maximum.	Interval between injections and rise of temperature above maximum normal.	Duration of Rise.	Amount of Rise.	REMARKS.
AFTER										
11 a.m.	2 p.m.	5 p.m.	8 p.m.	11 p.m.						
							Hrs.	Hrs.	Deg.	
102.	101.4	....	....	....	101.6—	102.	10—	16—	..	Negative.
100.	99.8	....	....	....	100+	100.3	..	..	..	"
101.8	102.5	....	....	....	102.2	102.5	10—	16—	.9	"
100.3	99.6	....	....	....	100.2	100.7	..	..	..	"
100.	100.6	....	....	....	100.1+	100.6	..	..	..	"
100.4	99.8	....	....	....	100.3—	100.6	10—	16—	..	"
100.6	100.6	....	....	....	100.6+	100.7	..	..	..	"
99.8	100.6	....	....	....	100.3	100.6	..	..	..	"
103.8	104.6	104.8	....	....	104.1+	104.8	10—	9+	.2	"
101.5	100.6	....	....	....	101+	101.5	..	..	..	"
101.5	101.4	....	....	....	100.9	101.5	..	..	..	"
100.	101.6	....	....	....	100.6+	101.6	..	..	..	"

s condemned and slaughtered :

gl.—Abdominal lymphatic glands.
Bronchial glands.
—Mammary glands.
—Mammary lymphatics.
-Diaphragm.
·Pericardium.

Mst. and br. gl.—Mediartinal and bronchial glands.
Subm. gl.—Submaxillary glands.
S. int.—Small intestines.
Mst. gl.—Mediartinal glands.
Mes. gl.—Mesenteric glands.
Perit.—Peritoneum.

been slaughtered in the regular way, in an abattoir, under the supervision of one of the Inspectors of d, in their respective columns.

NAME.	RE.	WATER FOR COWS.	WATER FOR WASHING UTENSILS.	DISPOSAL OF MILK.
District "A				
John Schnapp...	....	Croton	Croton	Personal use.
A. C. Wellach....	....	"	"	"
Patrick H. Dean..	xercise..............	"	"	Sold.
Little Sisters of th	ıck exercise........	"	"	Personal use.
Cath. Richardson,	ran ; good..........	"	"	Sold.
W. Borgstede.....	;ood................	"	"	Personal use.
Marg. Schwartz ..	: exercise; good.....	"	"	Sold.
J. Wagner........	nal feed, meal; gcod.	"	"	"
J. Twomey.......	good................	"	"	"
[redacted]	ıins ; good..........	Two wells........	"	Sold.
N. Y. Catholic Prote tory (female......	d....................	Westchester Water Co....	Westchester Water Co....	"
N. Y. Catholic Prote tory (male).......	d....................	Croton	Croton	"
C. Zimmer..........	ains ; good..........	Well and brook....	Well	"
P. Dugan	nal feed, brewery	Brook............	Bronx	"
J. Schwab..........	ery grains ; good....	Stream and two wells.........	Well	"
A. Hoffmann........	nal feed, brewery	Well	"	"
T. Ghee	ery grains ; good....	Well and stream...	"	"
A. Lang............	ains ; good..........	Well ; spring......	"	"
Embree Hill	s ; good............	"	"	"
William H. Deere...	ry grains ; good.....	Spring.....	Spring............	"
Matilda Callahan...	ins ; good...........	Brook.	Brook.	"
Phillip Trott........	ins ; good...........	Westchester Water Co....	Westchester Water Co....	"
E. Keegan..........	ins ; good...........	Well and stream...	Well	"

The following report shows the work performed in the Chemical aboratory of this Department:

The laboratory work may be conveniently divided as follows—

Daily and periodical examinations, as in the case of milk and water.

Examinations of samples collected by the various Inspectors of the ivision, either as the result of complaints of citizens or for special vestigations.

Samples examined for other departments of the City government.

Special investigations.

Experimental work.

The following table will show the character of the analytical work, iving the names of articles examined, what they were examined for and e reason for such examination:

SUBSTANCE.	EXAMINED FOR.	REASON FOR INVESTIGATION.
lmonds	Sulphuric acid	Suspected of being accidentally contaminated in transit.
eef hash	Injurious ingredients	Complaint of causing sickness.
eef, iron and wine	Composition	Complaint of being below standard.
eer	Per cent. alcohol	For Police Department in excise cases.
eer	Foreign bitters	Complaint of containing poisonous foreign bitters.
read	Metallic poisons	Suspected of containing copper sulphate.
ake	Lead	To prove character of egg substitutes.
andles	Compositions	Request of purchasing bureau.
anned goods, including meat, fish, vegetables, milk	General condition, metallic poisons and antiseptics	Citizens' complaints and investigations of Food Inspectors.
andy	Presence of alcohol and injurious admixtures	In relation to the suppression of the sale of candy containing alcohol to children, and general complaints.
e	Tyrotoxicon and poisonous metals	Complaints of causing sickness.
hocolate	Injurious ingredients	Suspected of containing injurious coloring materials.
ider (apple)	Injurious ingredients	On complaint of causing sickness.
ider (raisins)	Per cent. alcohol	For Police Department in excise cases.
offee	Injurious admixtures	Complaints of quality of ground coffee.
offee	Poisonous metals	Complaint of use of injurious colors to improve coffee beans, so-called "facing."
ream	Composition and preservatives	Systematic examinations.
ffluent from manufacturing establishments	Composition	Investigations in offensive trades.
gg substitutes	Composition and metallic poisons	Complaint of use in bakeries.
ssences (for liquors)	Composition	Special.
Fur boa	Poisons	Suspected of causing poisoning.
arbage	Per cent. of grease	For Department of Street Cleaning.
Hair grower	Metallic poisons	Complaint.
Ham	Poisonous metals and trichina	General complaints.
Ice	Sanitary purity	Complaint.
Ice cream	Injurious ingredients	Complaints of causing sickness.
Icing for cake	Poisonous ingredients	Complaints of causing sickness.
Liquid	Composition	For Police Department (so-called knock-out drops).
Meat	Injurious ingredients	Suspected of containing injurious coloring matter and preservatives.
Medicinal preparations	Composition	Complaint of citizens and for Coroner's office in suicide cases and in accidental poisoning.
Milk	Adulterations, composition; injurious ingredients	Routine inspections and special complaints.
Milk sugar	Purity	Complaint of physicians.
Mushrooms	Toadstools	Suspected of causing sickness.
Paste	Opium	For Police Department; violation of Pharmacy Law.
Pastry	Poisonous metals	Complaint.
Pop corn	Injurious ingredients	Complaint.
Pork	Trichinæ spiralis	Complaint.
Preserves	Injurious ingredients	Suspected of causing sickness.
Pretzel	Injurious ingredients	Suspected of causing sickness.
Rabbit's hair (fertilizer)	Sulphuric acid	Offensive trades.
Roach paste	Compositions	Complaint.
Sausage	Injurious ingredients	Complaint.

Substance.	Examined for.	Reason for Investigation.
Salve	Injurious ingredients	Complaint.
Silver polish	Composition	Suspected of being poisonous.
Soap	Injurious ingredients	Complaint of causing injury to skin.
Snuff	Poisonous metals	Suspected of containing poisonous coloring matters
Syrup	Injurious ingredients	Complaint.
Toothpicks	Injurious contamination	Complaint.
Urine	Composition	Clinical purposes.
Water, Croton	Sanitary purity	Weekly examination; special investigations.
Water, cellar	Character	To determine origin of water in cellars for Chief Sanitary Inspector and Department of Public Works.
Water, tank	Sanitary purity and metallic contamination	Complaint.
Water, carbonated, mineral, etc	Compositions, character and metallic impurities	To determine character of water used and effect on metal attachments when in siphons.
Water, well	Sanitary purity	Systematic examination of well waters in city limits; examinations of samples of suspected water from out-of-town wells, owned by city residents, and in connection with dairy inspection.
Whiskey	Metallic poisons	Complaint.
	Kerosene	Accidental contamination.
Wine	Per cent. alcohol	For Police Department and District Attorney in excise cases.
Wine, sherry	Poisonous metals	Complaint.
Whisp broom	Arsenic and copper	Suspected of being colored with paris green.
Vomited matter	Metallic poisons	Suspected accidental poisoning.

Of the routine work, the most important is that relating to the examinations of samples of milk and water, which has occupied the greater part of our time during the past year.

MILK.

Samples of milk, cream and condensed (evaporated) milk are brought to the Laboratory daily by the Milk Inspectors. These are examined by the Assistant Chemists, and, in case of adulteration and subsequent prosecution, the analyst appears in court as expert witness.

Method of Examination and Analysis.

(*a*) The condition of the sample is carefully observed by appearance, odor and reaction to litmus paper; samples which are "churned," *i. e.*, in which the fat has aggregated in lumps, which on gentle agitation do not thoroughly blend with the milk, are rejected; also samples decidedly acid and in which the casein has separated.

(*b*) Lactometer test made with standard lactometer at 60 degrees F.

(*c*) *Total Solids*—Five grams of milk (thoroughly mixed by gentle agitation) are weighed in a dry, tared, flat-bottom "lead-tin" or platinum capsule (diameter 1⅜ inches and ¾ of an inch deep; it is important that dish is no smaller than this). This dish is placed on a water-bath, a piece of clean filter-paper being in contact with the bottom, and when the water has apparently all evaporated, is transferred to an air-bath (carefully regulated to maintain a temperature of from 100–105 degrees C.) and allowed to remain for two and one-half hours. After cooling in a dessicator dish and contents are weighed, returned to air-bath for one-half hour and again weighed. If necessary, this reheating and reweighing is repeated until solids cease to lose in weight. From this final weight calculate total solids.

(*d*) Fat is determined by the Adams method, as follows:

About 5 grams of milk are rapidly and accurately weighed in a tared platinum dish. A paper coil, made by loosely rolling up a strip of fat-free paper, about 20 inches long and 2½ inches wide, held in position by a wire clamp, is held, one end up, in the dish, allowing a portion of the milk to be absorbed. The coil is reversed and the remainder of the milk, to the last trace, is absorbed by the other end of the coil, care being taken to handle it by the clamp only. Coil is placed in air-bath, being held in a vertical position by introducing the loop of the clamp into a clasp attached to the sides of the bath. As in the case of the determination of solids, the temperature must be constant from 100 to 105 degrees C. Two and one-half hours drying is usually sufficient. The coil is known to be dry when a cold watch-glass being held over one end of it, immediately after its removal from the bath, does not show a deposit of moisture. In making this test, the coil must be held in a vertical position. The dry coil is placed in an extracting apparatus, the form known as Knoefler's being preferred, connected with an upright condenser and a tared flask, and extracted with pure, anhydrous ethyl ether for two hours. The ether is distilled and may be used again, the flask placed on water-bath until all odor of ether has disappeared, then in air bath having a constant temperature of 100–105 degrees C. for one-half hour, or until the fat is of constant weight. The coil should be re-extracted until there is no longer a gain of fat. The weight of the fat is calculated in the usual way. The flask used above should be dried in the air-bath, and cooled in the air, before weighing. The flask containing the fat should be cooled in the same way. Care must be taken not to electrify the flask by rubbing the same when dry. The ether used must be free from residue, water and alcohol. Fat-free paper (commercial) must be proved to be free from extractive matter.

(*e*) In case salts are to be determined, proceed as above in the determination of total solids, using a platinum dish. The dry solids, after weighing, are gently ignited over a rose-burner, or in a muffle-furnace, taking care not to allow the heat to rise above a dull red. When ash appears white or gray, cool in a dessicator and weigh. Calculate percentage of salts or ash.

(*f*) *Sodium Chloride*—The ash obtained above is dissolved in an excess of dilute nitric acid. An excess of n/20 silver nitrate solution is now added, also a few c. c. of a solution of ferric sulphate (free from chlorides). The excess of silver nitrate is determined by titration with n/20 solution of ammonium sulphocyanate, the end reaction being shown by the red color produced with the ferric sulphate. The difference between the excess of silver nitrate thus determined, and the amount originally added, corresponds to the equivalent of chlorine in the ash.

(*g*) *Borax and Boric Acid*—100 c. c. of milk are made alkaline with lime-water, dried and the mixture gently burned to ash. The residue is acidified with concentrated hydrochloric acid and the mixture washed into a small flask with 20 c. c. of methyl alcohol. The flask is connected with a condenser and about 10 c. c. of the methyl alcohol distilled into a small platinum dish. The dish is placed in a dark closet or room and the alcohol ignited, when, if a trace of boric acid or borax were present, it burns with a grass-green flame. Blank tests must be made with the reagents used to prove absence of boric acid in them.

(*h*) *Formaldehyde or "Formalin"*—A few drops of milk are floated on a small amount of conc. sulphuric acid, containing a trace of ferric chloride. If formaldehyde is present, a violet-blue ring will appear at the line of demarcation.

(*i*) *Salicylic Acid*—The milk is coagulated by means of a few drops of acetic acid and filtered. The filtrate is shaken with ethyl ether in a separating-funnel. The ether is carefully drawn off and evaporated in a glass dish on the water-bath. The residue, if any, is treated with a very little water, filtered, and a drop of neutral ferric chloride added. A violet color indicates presence of salicylic acid or its salts.

(*j*) Alkaline carbonates may be detected by the strong alkaline character of the ash, and by its effervescing with dilute acids. A quantitative determination may be made by titrating the water solution of the ash with n/10 sulphuric acid, using lakmoid as an indicator.

(*k*) *Annato or Butter Color*—100 c. c. of milk, made strongly alkaline with sodium carbonate, are placed in a small cylinder, a strip of filter paper, about one-half inch wide and five inches long, is introduced, and the whole allowed to stand in the dark for twelve hours. If annato is present, the strip of paper, after washing, will have a pale salmon color, which is changed to a decided pink by moistening with solution of stannous chloride, and, after drying at the temperature of the room, to a blueish color on treatment with strong sulphuric acid.

Method of the Estimation of Fat in Milk and Cream by Means of the Butyrometer of De Laval (Centrifugal Machine).

For the rapid estimation of fat, in large numbers of samples of milk or cream, where the absolute accuracy of chemical analysis is not necessary, the above apparatus has been found to be of the greatest service. A very large number of tests can be made in a short time, the results being quite uniform. From the great number of comparative tests made with the butyrometer and Adams method, we are of the opinion that uniform fat determination can be made, which should not differ more than 0.10 per cent. from analytical method (Adams). The principle of the butyrometer is, that if milk is mixed with sulphuric acid of a certain degree of strength (sp. gr. 1.80), all of the constituents of the milk, excepting the fat, are brought into perfect solution, and when the mixture is subjected to centrifugal action, a perfect separation of the fat takes place. The apparatus in use in the laboratory consists of a flat disc or bowl, capable of holding twenty test glasses. These are arranged in grooves in an almost horizontal position, and are held in place by a screw-cap. This bowl revolves in a horizontal position on a pivot, the motive power being steam, on the principle of a steam-turbine. The bowl is encased in a solid iron frame, having a strong tin cover. The machine is operated as follows:

Filling the Tubes.

Use rubber-finger cots on the thumb, first and third fingers of left hand. Hold the empty tube in the protected hand. Cover the graduated end of the tube with the forefinger, and the escapement aperture in the shoulder of the tube with the thumb, using the other fingers to hold the tube in an upright position, big end up.

Fill the tube to the mark with cold, dilute H_2 SO4, made up as follows:

88 parts H_2 SO4, 1.84 sp. gr.
12 parts dist. water.
Mixture, approx. 1.80 sp. gr.

Completely fill the pipette which accompanies the butyrometer with an average sample of the milk to be tested, closing the aperture with the tongue, and empty into the tube already partially filled with sulphuric acid. Close the tube with a rubber stopper and shake to thoroughly mix contents, being careful to keep the two remaining apertures tightly covered with the fingers.

When this operation is complete, place the tube in the tray, taking the thumb off the aperture in the shoulder *first*. Make no mistake in giving the sample of milk used its proper tube number.

In this manner fill twenty tubes with other samples, or with duplicates, in order that the disc may be completely filled to insure its perfect balance. An imperfect balancing of the disc causes a serious wobbling, which strongly interferes with the speed desired.

Even by placing the same number of tubes in opposite halves of the disc (if less than ten), though a perfect balance is obtained, the results are unsatisfactory with the present construction of the machine. This is due to the increased room for play given to the lesser number of tubes.

Having filled the tubes, place them in the grooves in the disc, graduated ends toward the centre and the shoulder aperture *up*. Screw on the cap tightly. Fit to the machine the lower part of the tin box in which the disc revolves. Fit the disc to the spindle, put on the cover, and close the hole in the cup on the cover with the brass stopper. Fill the cup with water at 150 degrees F.; pull out the stopper, and start the disc revolving. Increase the speed to the maximum of 5,000 revolutions per minute, and continue for five minutes. Catch the overflow of water in a casserole or basin. After five minutes of operation cool the disc to 52 degrees F. by running ice-water through the machine, taking the temperature as it escapes through the overflow. When cooled to 52 degrees F. take off cover, unscrew cap and take out the tubes as fast as they are read. Read the tubes from the top of the fat to the bottom, each division of the graduation corresponding to two-tenths per cent. of fat.

For testing cream and skim-milk, special glasses are provided. The cream-testing glasses are graduated so that each division corresponds to 1 per cent. of fat; in the skim-milk 0.05 per cent.

Milk Standard.

A sample of milk is considered to be adulterated when it contains less than 12 per cent. of total solids, or less than 3 per cent. of fat, or contains any preservative or added coloring matter, or any added foreign substance.

By clearly defining what is meant by the term adulterated milk, and adopting a legal standard for it (amendment to section 186 Sanitary Code) the work of the analysts, in their capacity as expert witnesses before the courts, has been very much simplified. Where before it was often necessary to prove, from large personal experience in the examination of samples of milk from herds in various sections of the State and taken at different seasons of the year, the correctness of the standard then agreed upon, the justices now simply require the analyst to prove that the analysis shows that a particular sample of milk is below the adopted standard.

It is unfortunate that while, of course, the object of the law is to prevent *all* adulteration of milk, the low standard of fat, 3 per cent., not only legalizes but encourages a vast amount of minor adulteration. This can be readily understood when it can be shown that for the greater part of the year a majority of the herds supplying this market yield milk containing 4 per cent. and over of fat. This condition will probably not be materially changed until milk is sold entirely on its merits, as are other commodities. For the present the most that can be hoped for is the prevention of extensive adulteration.

The following forms represent leaves from Laboratory milk analysis book :

No...... Date.................189
Inspector..................Time..........
Name......................................
Address...................................

ANALYSIS.

Odor......................................
Reaction..................................
Fat by lactoscope.........................
Lactometer at 60° Fahr....................
Water.....................................
Fat.......................................
Total solids..............................
Solids not fat............................
Salts.....................................
Antiseptics...............................
Remarks...................................

No........
Total solids..............................
....
....
....
Fat.......................................
....
....
....
....
....
Salts.....................................
....
....
Finished..................................189
Reported..................................189

Table showing per cent. of deficiency of solids in samples of milk below the standard of 12 per cent. of total solids.

DEFICIENT IN SOLIDS.	PER CENT. OF TOTAL SOLIDS.	DEFICIENT IN SOLIDS.	PER CENT. OF TOTAL SOLIDS.
Less than 1 per cent	11.89—12.00 per cent.	26 per cent	8.77—8.88 per cent.
1 per cent.	11.77—11.88 "	27 "	8.65—8.76 "
2 "	11.65—11.76 "	28 "	8.53—8.64 "
3 "	11.53—11.64 "	29 "	8.41—8.52 "
4 "	11.41—11.52 "	30 "	8.29—8.40 "
5 "	11.29—11.40 "	31 "	8.17—8.28 "
6 "	11.17—11.28 "	32 "	8.05—8.16 "
7 "	11.05—11.16 "	33 "	7.93—8.04 "
8 "	10.93—11.04 "	34 "	7.81—7.92 "
9 "	10.81—10.92 "	35 "	7.69—7.80 "
10 "	10.69—10.80 "	36 "	7.57—7.68 "
11 "	10.57—10.68 "	37 "	7.45—7.56 "
12 "	10.45—10.56 "	38 "	7.33—7.44 "
13 "	13.33—10.44 "	39 "	7.21—7.32 "
14 "	10.21—10.32 "	40 "	7.09—7.20 "
15 "	10.09—10.20 "	41 "	6.97—7.08 "
16 "	9.97—10.08 "	42 "	6.85—6.96 "
17 "	9.85— 9.96 "	43 "	6.73—6.84 "
18 "	9.73— 9.84 "	44 "	6.61—6.72 "
19 "	9.61— 9.72 "	45 "	6.49—6.60 "
20 "	9.49— 9.60 "	46 "	6.37—6.48 "
21 "	9.37— 9.48 "	47 "	6.25—6.36 "
22 "	9.25— 9.36 "	48 "	6.13—6.24 "
23 "	9.13— 9.24 "	49 "	6.01—6.12 "
24 "	9.01— 9.12 "	50 "	5.89—6.00 "
25 "	8.89— 9.00 "		

CREAM.

Cream is known in the trade as " hand skimmed " and machine cream, the latter being classed as 18, 20, 25, 30, 35 and 40 pound cream, according to the number of pounds of butter a can of 40 quarts milk yields.

Complete analyses were made of a large number of samples of the various creams in the market.

The following analyses show the amount of fat in creams from five different producers :

Name.	18 Pounds.	20 Pounds.	25 Pounds.	30 Pounds.	35 Pounds.	40 Pounds.
	Per Cent.	Per Cent.	Per Cent.	Per Cent.	Per Cent.	Per Cent.
A	14.35	16.35	33.55	36.75	35.93	42.99
B	14.38	15.23	35.40	33.33	37.40	38.25
C	16.90	19.05	32.15	29.93	40.93	38.23
D	15.50	16.95	35.28	26.95	42.35	41.62
E	17.53	23.05	33.83	26.88	38.93	37.23
Average	15.73	18.13	34.04	30.77	39.11	39.66

It will be seen from these results that there is no uniformity in the composition of creams having the same trade name.

As there is at present no legal standard, cream is examined only for preservatives, added coloring matter and in some instances starch.

(*a*) *Preservatives*—Proceed as under milk.

(*b*) *Annato or Butter Color*—Dilute if necessary with distilled water and proceed as under milk.

(*c*) Starch.

1. *Chemical Examination*—Dilute with water, boil for some minutes, allow to become cold and add few drops of test solution of iodine. If starch is present, a blue coloration will take place.

2. *Microscopic Examination*—Place the cream, somewhat diluted, in a conical glass (urine or sherry glass), allow to stand some hours. With a pipette remove a few drops of portion at bottom of glass and examine for starch granules under the microscope.

CONDENSED MILK, EVAPORATED MILK, PRESERVED MILK, EVAPORATED CREAM (SO-CALLED).

Condensed milk is a general term used for all milks which have been concentrated by the removal of more or less water.

Evaporated milk is plain condensed milk. It is sold in bulk and comes into market in two forms—thick or superheated and thin or "pearl." This form of condensed milk is rather unstable and will remain sweet very little longer than ordinary milk when kept under the same conditions.

Thin, or pearl evaporated milk, is made by condensing at a temperature not exceeding 125 degrees F. and has an average composition as follows :

Water	51.30 per cent.	Total solids	48.70 per cent.
Fat	13.45 "	Solids, not fat	35.25 "

Thick, or superheated evaporated milk, is condensed as above to a certain point, when the temperature is suddenly raised to 180 degrees F., and allowed to remain so for a few minutes, causing the milk to thicken on account of the effect of the heat on the casein, and also producing a decided yellow color.

The average composition of thick, evaporated milk is as follows :

Water	58.50 per cent.	Total solids	41.50 per cent.
Fat	11.81 "	Solids, not fat	29.69 "

It is of interest to note that, while this milk is much richer looking and thicker than the last, it contains, as a fact, more water and less fat than the "thin evaporated milk."

A sample of evaporated milk may be considered of good quality when the fat represents at least 25 per cent. of the milk solids.

Analysis of Evaporated Milk.

(*a*) Total solids and ash.

Two grams of the milk are weighed in a tared platinum milk dish, about 5 c. c. of distilled water are added, and a thorough mixture effected by stirring with a small glass rod. The rod is washed by means of a fine stream from wash-bottle. The total solids and ash are determined as in the case of milk ; a lead capsule is used when ash determination is not required.

Fat—2 grams are weighed, as for total solids, dissolved and soaked on paper, dried and extracted as under milk.

Preservatives are determined as under milk and cream.

Preserved Milk.

Preserved milk is condensed milk containing from 40 to 50 per cent. of cane sugar. It is sold in tins and, on account of large amount of sugar, will keep for a long time even when exposed to the air.

Method of analysis.

Total solids and ash.

Forty grams of the milk (previously very thoroughly mixed by removing entire contents from tin and stirring in a mortar) are weighed in a tared beaker, thoroughly mixed with distilled water and diluted to 100 c. c. Of this solution 5 c. c. (2 grams milk) are introduced by means of a pipette into a tared platinum dish, and the total solids and ash determined as under milk.

Fat—5 c. c. of the diluted milk (2 grams) are tansferred by means of a pipette to a fat-free coil and the fat determined as under milk.

Sugar Determination.

Preserved Milk.

The determination of milk sugar and cane sugar in preserved milk is performed after the following method :

1 Standard solutions used :

(*a*) Permanganate of potash.
(*b*) Ammonio-ferric alum.
(*c*) Citric acid.
(*d*) Fehling solution.

2. Determination of milk sugar.

3. Determination of cane sugar.

1. (*a*) Permanganate solution :

6.5 grams permanganate potash dissolved in 1 litre of distilled water. Standardize in terms of metallic iron with C. P. oxalic acid.

0.011239 grams Fe. = 0.010011 grams lactose.
0.011239 " = 0.006958 " cane sugar.

(*b*) Ammonio-iron alum :

Ammonio-iron alum	200 gms.
H_2SO_4 (conc.)	100 c. c.
Water	1 litre.

(*c*) Citric acid solution :

Fifty per cent. solution in water.

(*d*) Fehling solution :

(1) Rochelle salts	346 gms.
Caustic soda	80 "
Water q. s	1 litre.
(2) Copper sulphate	69.28 gms.
Water q. s	1 litre.

2. Determination of Milk Sugar :

Twenty grams of the preserved milk are weighed out and dissolved in water, making up to 300 c. c. To this two or three drops of acetic acid are added and the whole vigorously stirred with a glass rod to insure complete and granulated coagulation (care should be used not to add more acid than is absolutely necessary and to perform the operation in the cold). Allow to settle for a few minutes and filter through a dry, ribbed filter, repeating the filtration if the filtrate is not clear. Ten c. c. of the filtrate are then run into a beaker containing about 50 c. c. To this is added 15 c. c. to 20 c. c. of Fehling solution and 15 c. c. of water, the whole being then heated on the water bath until complete separation of copper oxide takes place (twenty minutes to one-half an hour, not longer). Filter through wet filter (not ribbed) by decantation, washing three to four times with hot water, allowing to stand on water bath each time before filtering. The oxide of copper is then quickly dissolved with ammonio-ferric alum solution in the beaker. If any oxide has run on the filter, dissolve this by running the alum solution through the filter. Combine the solutions and add about 300 c. c. of water. This is then titrated with the standard permanganate solution. From this data the amount of lactose is calculated, knowing the value of each c. c. of permanganate in terms of lactose.

3. Determination of Cane Sugar :

One hundred c. c. of the coagulated filtrate, as obtained above, is run into a beaker, and 100 c. c. water and 5 c. c. citric acid solution added. This is then evaporated at gentle heat to 100 c. c. and allowed to cool. 5 c. c. of this solution is run into a beaker holding about 100 c. c. and treated in the same manner as for the determination of milk sugar. Double the amount of Fehling solution and double the amount of water should be used, however. After titration with permanganate, we have the total amount of sugar, and from this should be deducted the amount of milk sugar, as previously determined, and the result will be cane sugar.

Preservatives, as under cream.

Evaporated Cream (*so-called*).

This is simply evaporated milk in tins, which has been sterilized by means of heat. The name is a deception. At present there is no such product made as evaporated cream, namely, condensed cream.

WATER.

Croton Water.

Samples are taken each week from a public hydrant, located at or near Franklin and Elm streets. Complete sanitary analyses are made in each case, the results of which are published in the Weekly Report of the Department, also in the " City Record." Comparative samples have also been taken from gate-house at Amsterdam avenue and One Hundred and Thirty-fifth street, and at intervals at Central Park Reservoir and from various hydrants in different parts of the city.

Method of analysis of water.

In each case the following determinations are made :

FORM OF REPORT USED FOR CROTON WATER ANALYSES.

HEALTH DEPARTMENT, CITY OF NEW YORK,
SANITARY BUREAU.

Analysis of Croton Water for..189....

Sample taken from..

	RESULTS EXPRESSED IN GRAINS PER U. S. GALLON OF 231 CUBIC INCHES.	RESULTS EXPRESSED IN PARTS BY WEIGHT IN ONE HUNDRED THOUSAND.
Appearance		
Color		
Odor (Heated to 100° Fahr.)		
Chlorine in Chlorides		
Equiv. to Sodium Chloride		
Phosphates (P_2O_5)		
Nitrogen in Nitrites		
Nitrogen in Nitrates		
Free Ammonia		
Albuminoid Ammonia		
Total Nitrogen		
Hardness Equiv. to Carbonate of Lime { Before Boiling		
After Boiling		
Organic and Volatile (loss on ignition)		
Mineral Matter (non-volatile)		
Total Solids (by evaporation)		

Remarks..

Date..................................189....

Form of report used for water analyses other than Croton water :

HEALTH DEPARTMENT, CITY OF NEW YORK,
SANITARY BUREAU.

Analysis No..................
Date Received..................................189
Date Reported..................................189
Received from..
Marked..
....
Reason for Analysis..

REPORT.

	Results Expressed in Grains per U. S. Gallon of 231 Cubic Inches.	Results Expressed in Parts by Weight in One Hundred Thousand.
Appearance		
Color		
Odor (Heated to 100° Fahr.)		
Chlorine in Chlorides		
Equiv. to Sodium Chloride		
Phosphates		
Nitrogen in Nitrites		
Nitrogen in Nitrates		
Free Ammonia		
Albuminoid Ammonia		
Hardness Equiv. to Carbonate of Lime: Before Boiling		
Hardness Equiv. to Carbonate of Lime: After Boiling		
Organic and Volatile (loss on ignition)		
Mineral Matter (non-volatile)		
Total Solids (by evaporation)		
Total Nitrogen		

Remarks..
Date..................................189...

Arrangement of Laboratory note-book for recording water analyses :

Received....................189....
....................M., No............
Sample taken from..............................
....

ANALYSIS.

	Parts by Weight in One Hundred Thousand	Grains per U. S. Gallon.
Appearance		
Color		
Odor (Heated to 100° Fahr.)		
Chlorine in Chlorides		
Equiv. to Sodium Chloride		
Phosphates		
Nitrogen in Nitrites		
Nitrogen in Nitrates		
Free Ammonia		
Albuminoid Ammonia		
Hardness Equiv. to Carbonate of Lime: Before Boiling		
Hardness Equiv. to Carbonate of Lime: After Boiling		
Organic and Volatile (loss on ignition)		
Mineral Matter (non-volatile)		
Total Solids (by evaporation)		
Total Nitrogen		

REMARKS.

Temp.=..............................

Total Solids by Evaporation 100 c. c..................
....
....
....
....
Chlorine 1 L..............................
....
Hard B. B. 100 c. c..............................
....
Hard A. B. 100 c. c..............................
....
Phosphates..............................
Nitrites..............................

Date....................
Total Ammonia—500 c. c.—Free Ammonia :
1—50 c. c..............................
2— " ....
3— " ....
4— " ....
5— " ....
6— " ....
7— " ....
8— " ....
Nitrogen in Nitrates, etc. :
....
....
....
Finished....................189...
Reported....................189...

Method of Water Analysis.

Sediment—In case sample is turbid, fill sediment tube, consisting of a two foot long tube, one inch in diameter, attached in an upright position to a stand. The upper end of tube is open, the lower end closed, but having about one inch from extremity a ground glass joint. The bottom is conical. Just above the joint there is a small exit tube to which is attached a piece of rubber tubing with pinch cock. Allow water to settle in tube 12 hours, then discharge it from side exit tube, taking care not to disturb the sediment from the main tube and examine sediment by means of the microscope for character.

Examination of Sediment—Determine total solids before and after filtration through filter paper, and from the difference estimate matters in suspension, organic and mineral.

Appearance—Determined by noting the amount of turbidity, including the sediment, and classifying as very turbid, somewhat turbid, slightly turbid and clear.

Color—Estimated by filling a tube two feet in length, one and one-half inches in diameter, and made of colorless glass, with the water, and observing the color by looking through the water either at the sky or at a white paper.

Odor—Ascertained by heating in a closely-stoppered flask, provided with a thermometer, about 250 c.c. of the water to 100 degrees F., and noting the odor, which we classified as follows: None; faint; and musty, marshy or earthy; qualifying these latter as faint, decided and strong.

Chlorine—Reagents required: Hydrochloric acid, nitrate of silver (crystalized), chromate of potassium, dry carbonate of sodium or chloride of sodium.

(*a*) Nitrate of silver n/20—Nitrate of silver, 8.5 grams; distilled water (free from organic matter), 1 litre.

(*b*) Chromate of potassium, 1 gram; distilled water, 100 c.c. Add silver nitrate solution until permanent red precipitate is formed; filter for use.

(*c*) Chloride of sodium, n/20. This solution is prepared—

1st. From carbonate of sodium—Heat in a platinum dish about 10 grams of carbonate of sodium to dull redness, stirring with a platinum rod; cool in desiccator; weigh out 2.9066 grams, dissolve in slight excess of hydrochloric acid, evaporate to dryness on water-bath with repeated additions of water, until all of the uncombined acid is driven off, and dilute to 1 litre with distilled water.

$$1 \text{ c.c. contains} \begin{cases} 0.001598 \text{ grams of chlorine} \\ 0.002638 \text{ grams of chloride of sodium.} \end{cases}$$

2d. From chloride of sodium—Heat in a platinum dish about 10 grams of pure chloride of sodium until crepitation ceases, constantly stirring with platinum rod. Transfer while hot to dry tube, cork tightly and cool. Weigh out 2.6376 grams and dilute to 1 litre with distilled water.

$$1 \text{ c.c.} = \begin{cases} 0.001598 \text{ grams of chlorine.} \\ 0.002638 \text{ grams of chloride of sodium.} \end{cases}$$

Standardize the n/20 nitrate of silver solution with the n/20 chloride of sodium solution, using two drops of the chromate of potassium solution as an indicator.

Note.—It has been found (Analyst, vol. xiv., page 123) that in order to obtain concordant results, the same bulk of liquid as employed in the standardization must be used when making the analysis; the same amount of the chromate of potassium solution must also be used in each case.

To determine the amount of chlorine in water, measure out a quantity dependent on the amount of chlorine presumably present, and proceed as in standardization of the nitrate of silver solution, observing the precautions given for this, as to bulk of solution, etc. In evaporating a water low in chlorine, it is well to add a small amount (say 0.1 gram) of sodium carbonate to prevent loss of chlorine, and this should always be done if the water have an acid reaction. Evaporate on water bath.

Sodium Chloride—This is calculated from the amount of chlorine, determined as above.

Phosphates—Determined qualitatively in the residue from the determination of mineral matter, by dissolving the residue in a small quantity of conc. nitric acid, diluting slightly, filtering and adding a few drops of tests solution of molybdate of ammonia and warming. A yellow precipitate indicates phosphates. Should such precipitates be obtained, evaporate from 250 to 500 c.c. of the water to dryness, having added a few drops of conc. hydrochloric acid—dehydrate as in silica determination, taking up first with concentrated hydrochloric acid—add conc. nitric and heat to remove hydrochloric acid, dilute, filter and test filtrate for phosphates as above.

Nitrogen in Nitrites (*Method of Leffmann and Beam*)—Reagents required: Sulphanillic acid, napthylamine, acetic acid (glacial), nitrite of silver, chloride of sodium, distilled water, free from nitrites and ammonia.

(*a*) Sulphanilic acid solution—Sulphanilic acid, 0.500 grams, dissolved in distilled water, 100 c.c.; then add acetic acid (glacial), 50 c.c.

(*b*) Acetate of napthylamine—Napthylamine, 0.100 grams, dissolved in distilled water, 140 c.c.; then add acetic acid (glacial), 60 c.c.

(*c*) Nitrite of sodium (strong solution)—Nitrite of silver, 0.275 grams, dissolved in distilled water to 250 c.c.; then add chloride of sodium, 0.105 grams, or enough to transform all nitrite of ilver to chloride of silver and nitrite of sodium. Keep in black glass bottle away from light. 1 c. c. contains nitrous acid equivalent to 0.0001 grams of nitrogen.

(*d*) Nitrite of sodium (standard solution)—Nitrite of sodium (strong solution), 1 c. c.; distilled water to 500 c. c. 1 c. c. contains nitrous acid equivalent to 0.0000002 grams of nitrogen.

To determine the nitrogen in nitrites in a water, measure from burette into 100 c. c. Nessler tubes ½, 1, 2, 3, 4, and 5 c. c., respectively, of the standard nitrite solution. Fill to 100 c. c. mark with distilled water free from nitrites. Fill another tube to 100 c. c. mark with the same water (this for blank test), and another to 100 c. c. mark with water to be tested. Add to each of these tubes 2 c. c. of the sulphanilic acid and 2 c. c. of the acetate of napthylamine solution. Mix contents of tubes by means of glass stirrer; allow to remain for twenty minutes, and then match colors. If tube containing blank test shows reaction for nitrites, fresh standard tubes must be made up and the analysis repeated.

Nitrogen in Nitrates and Nitrites (*Sodium amalgam method*).

Sodium Amalgam—Mercury, 400 grams; sodium (metallic) 20 grams. Place the mercury in a porcelain casserole in a well drawing hood. Cut the sodium in small pieces and drop one piece at a time into the mercury. Do not put in more sodium until the reaction caused by the last piece is completed. Reaction is violent and the operation should be carried on very slowly. When sodium has all been added pour as quickly as possible into an iron mould, each piece having shape of a truncated cone of the following dimensions.

Height, ½ inch; diameter of large base, ¾ inch; diameter of small base, ½ inch (keep under benzine).

To about 100 c. c. of the water in a Nessler tube, add one piece of amalgam, after washing it with water to remove any benzine or film of oxide. Add a few drops of conc. hydrochloric acid and allow reduction to take place until nitrates are all reduced (absence of nitrites). Filter through small filter, discarding the first 50 c. c. The second 50 c. c. is nesslerized as in the determination of ammonia, comparing with standard solutions of ammonium chloride. The amount of ammonia obtained by this method represents free ammonia plus ammonia equivalent to nitrates. To determine the latter, then, the former must be subtracted from the whole.

Free Ammonia—Reagents required: Carbonate of soda (saturated solution), Nessler's solution, chloride of ammonia (standard), distilled water (free from ammonia).

The distillation is carried on in a glass stoppered flask of a capacity of two litres, having a side exit tube connected with an upright block tin condenser. The heat is supplied by a large rose burner. Fill retort about half full of water; we always use water free, or almost free from ammonia. Add 2 c. c. of the carbonate of soda solution, and distill until 50 c. c. of the distillate shows no reaction for ammonia with Nessler's solution. Add 500 c. c. of the water to be examined, and distill off in separate portions of 50 c. c. into Nessler tubes until the last 50 c. c. distilled off shows no reaction for ammonia. The ammonia is estimated by matching the color produced by Nessler's solution in the distillates with that produced by the solution in one of the series of standard tubes, which latter are prepared by measuring into Nessler's tubes ¼, ½, 1, 2, 3 and 4 c. c. of the standard ammonium chloride solution, repectively, and filling to the 50 c. c. mark with distilled water free from ammonia. The tubes will then contain 0.0025, 0.0050, 0.01, 0.02, 0.03 and 0.04 milligrams of ammonia (NH_3) respectively. The analysis and comparison tubes should all be nesslerized at the same time, which is done by adding to each tube 2 c. c. of Nessler's solution, and mixing with glass stirrer. They should be allowed to stand at least five minutes before reading.

Albuminoid Ammonia—Reagents required: Same as in determination of free ammonia, with the addition of permanganate of potassium and caustic potash.

Alkaline permanganate of potassium—Permanganate of potassium, 8 grams, dissolved in distilled water (free from ammonia) 1 litre; add caustic potash, 200 grams, and boil in long-necked flask, to prevent much evaporation, for one hour; make up to one litre with distilled water (free from ammonia).

To determine the amount of albuminoid ammonia, proceed as in determination of free ammonia, with the exception of adding 50 c. c. of the alkaline permanganate solution, instead of 2 c. c. of carbonate of sodium solution. The result will be the total ammonia present. From this deduct the free ammonia as found; the result will be the amount of albuminoid ammonia.

In determining the amount of albuminoid ammonia in peat waters, it appears in certain cases to be impossible to arrive at a point where no ammonia is given off. Drown proposes to take off a certain number of distillates, say 6, and then stop. We, in practice, continue distillation until the last 50 c. c. taken shows less than 0.0025 milligrams of ammonia. We have suggested that 500 c. c. of water be used for each of the ammonia determinations. This is applicable to Croton, or to a water which apparently produces no reaction with Nessler's solution on 50 c. c. of the raw water. If the raw water shows say 0.01 milligrams, or more, of ammonia on 50 c. c., less than 500 c. c. should be taken for analysis; or if the water contains much ammonia, 200 c. c. can be taken and 300 c.c. distilled off. 50 c.c. of this can be nesslerized and the ammonia calculated to a litre.

The successive distillates, in the determination of both free and total ammonia, should exhibit a steady decrease in the amount of ammonia contained. If this is not the case, the analysis must be repeated.

Hardness, Equivalent to Carbonate of Lime, before and after Boiling—1st. By soap solution. Reagents required: A neutral hard soap, containing not more than 12 per cent. of water; alcohol, 90 per cent.; calc. spar (crystalized) free from alkalies and chlorides; hydrochloric acid, C. P.; distilled water.

(*a*) Soap solution (strong)—Soap 10 grams, cut into small pieces, dissolve in 1 litre of 90 per cent. alcohol and filter.

(*b*) Soap solution (standard)—Soap solution (strong), 100 c.c.; add to this alcohol (90 per cent.), 33 c.c.; and distilled water, 100 c.c. Shake gently, allow to stand until clear, and decant.

(*c*) Standard solution of calcium chloride—Calc. spar, 1 gram, dissolved in small amount of hydrochloric acid; evaporate to dryness on water bath, with repeated additions of distilled water, until all uncombined acid is driven off. Dilute this to 1 litre with distilled water. 1 c.c. is equivalent to 0.001 gram of calcium carbonate.

The soap solution is standarized as follows: 100 c.c. of distilled water is run into a glass-stoppered bottle of about 250 c.c. capacity. 5 c.c. of the calcium chloride solution is run in from a burette, and the soap solution added, not more than 0.25 c.c. at a time, shaking well after each addition, until the addition of the last portion produces a permanent lather. The lather formed should remain on the surface of the liquid in the bottle for five minutes without breaking. Taking the amount given, 1 c.c. of the soap solution should be equivalent to 0.0005 grams of calcium carbonate. The amount of the calcium chloride solution used should be about equivalent to the amount of lime salts contained in the water to be examined.

Hardness before boiling—100 c.c. of the water are measured into a bottle and the analysis conducted as in the standarization of the soap solution.

Hardness after boiling—100 c.c. of the water and 100 c.c. of distilled water are measured into a 250 c.c. flask and boiled until the bulk is reduced to 100 c.c. This is filtered into a bottle, cooled and the examination completed as above.

Total solids—100 c.c. of the water are measured into a tared platinum dish and evaporated to dryness on the water bath. The dish is placed in an air-bath and heated at 130 degrees Fahr. for one half hour. Cool in desiccator and weigh.

Organic and volatile matters (loss on ignition) and mineral matter—The contents of the dish are heated to dull redness over a Bunsen burner until the organic matter is driven off. The dish is then placed in a desiccator, cooled and weighed. The loss represents the organic and volatile matter and the residue the mineral matter.

Water Laboratory.

All water analyses must be conducted in a specially constructed room, which can be completely separated from the general working laboratory, and under no circumstances should ammonia or its salts be brought in this room.

The following table shows the averages of the weekly examination of Croton water for each month during 1896; also highest and lowest results and yearly average expressed in parts per 100,000:

1896.		Temperature Fahr.	Appearance.	Chlorine in Chlorides.	Equivalent to Sodium Chloride.	Phosphates.	Nitrogen in Nitrites.	Nitrogen in Nitrates.	Free Ammonia.	Albuminoid Ammonia.	Total Nitrogen.	Hardness Before Boiling.	Organic and Volatile Matter.	Mineral Matter.	Total Solids.
January	Highest	40	T.	0.298	0.491	None	None	0.0469	0.0035	0.0490	0.0733	4.92	3.90	10.80	14.70
	Lowest	36	S. T.	0.263	0.434	"	"	0.0301	0.0015	0.0150	0.0453	4.57	2.20	6.10	8.60
	Average	38	T.	0.289	0.477	"	"	0.0355	0.0029	0.0260	0.0499	4.74	2.72	8.20	10.92
February	Highest	38	V. T.	0.289	0.477	"	"	0.0531	0.0055	0.0445	0.0943	4.36	3.80	11.60	15.10
	Lowest	34	S. T.	0.227	0.376	"	"	0.0371	0.0030	0.0275	0.0721	3.16	2.90	8.30	11.80
	Average	35	T.	0.268	0.443	"	"	0.0477	0.0046	0.0364	0.0814	3.69	3.30	9.70	13.00
March	Highest	36	V. T.	0.245	0.405	Trace	"	0.0470	0.0045	0.0475	0.0886	3.87	3.10	11.40	14.50
	Lowest	34	S. T.	0.175	0.289	None	"	0.0383	0.0030	0.0240	0.0618	3.51	2.40	6.60	9.00
	Average	35	T.	0.228	0.376	Ft. Trace	"	0.0446	0.0035	0.0333	0.0749	3.66	2.68	8.00	10.68
April	Highest	56	V. T.	0.297	0.491	Trace	"	0.0588	0.0035	0.0335	0.0864	3.66	3.30	9.10	11.80
	Lowest	38	T.	0.245	0.405	None	"	0.0313	0.0015	0.0245	0.0605	3.16	2.00	7.40	9.40
	Average	45	T.	0.271	0.448	Ft. Trace	"	0.0442	0.0025	0.0299	0.0703	3.46	2.48	8.20	10.68
May	Highest	66	T.	0.271	0.450	None	"	0.0313	0.0025	0.0325	0.0597	3.86	2.60	7.70	9.80
	Lowest	56	S. T.	0.254	0.419	"	"	0.0227	0.0015	0.0165	0.0423	3.65	2.10	5.10	7.30
	Average	62	T.	0.261	0.431	"	"	0.0264	0.0020	0.0226	0.0469	3.82	2.28	5.74	8.02
June	Highest	68	S. T.	0.280	0.462	"	"	0.0276	0.0020	0.0185	0.0388	3.86	2.50	5.80	8.10
	Lowest	66	S. T.	0.234	0.390	"	"	0.0189	0.0015	0.0120	0.0358	3.75	2.10	4.70	7.20
	Average	67	S. T.	0.253	0.419	"	"	0.0232	0.0019	0.0155	0.0375	3.83	2.25	5.32	7.57
July	Highest	73	S. T.	0.280	0.462	"	"	0.0272	0.0020	0.0200	0.0383	3.75	2.40	5.30	7.60
	Lowest	68	V. S. T.	0.245	0.405	"	"	0.0198	0.0010	0.0115	0.0305	3.75	1.60	5.10	6.70
	Average	71	V. S. T.	0.264	0.436	"	"	0.0235	0.0015	0.0137	0.0345	3.75	2.06	5.20	7.26
August	Highest	77	S. T.	0.273	0.450	"	"	0.0235	0.0030	0.0360	0.0543	5.52	2.40	6.00	8.40
	Lowest	70	V. S. T.	0.248	0.407	"	"	0.0193	0.0015	0.0115	0.0342	3.75	1.60	5.40	7.10
	Average	74	V. S. T.	0.260	0.428	"	"	0.0220	0.0020	0.0201	0.0422	4.36	2.18	5.67	7.85
September	Highest	68	V. S. T.	0.256	0.421	"	"	0.0235	0.0025	0.0160	0.0379	5.45	2.30	6.40	8.70
	Lowest	65	V. S. T.	0.239	0.393	"	"	0.0193	0.0015	0.0155	0.0338	4.33	1.60	5.60	7.20
	Average	67	V. S. T.	0.266	0.404	"	"	0.0223	0.0018	0.0158	0.0366	4.64	2.05	5.93	7.98
October	Highest	64	T.	0.282	0.464	"	"	0.0239	0.0025	0.0295	0.0445	4.94	3.20	7.30	10.50
	Lowest	52	V. S. T.	0.239	0.393	"	"	0.0152	0.0010	0.0145	0.0288	4.02	1.90	5.00	7.70
	Average	57	S. T.	0.267	0.439	"	"	0.0195	0.0015	0.0209	0.0378	4.33	2.54	6.14	8.68
November	Highest	52	S. T.	0.291	0.478	"	"	0.0235	0.0025	0.0255	0.0457	4.63	2.50	7.00	9.10
	Lowest	47	V. S. T.	0.282	0.464	"	"	0.0193	0.0010	0.0130	0.0313	4.33	1.60	5.00	7.20
	Average	49	S. T.	0.289	0.476	"	"	0.0213	0.0016	0.0158	0.0376	4.49	2.10	6.13	8.23
December	Highest	44	T.	0.299	0.492	"	"	0.0280	0.0035	0.0300	0.0518	4.85	2.90	7.50	10.20
	Lowest	36	V. S. T.	0.265	0.436	"	"	0.0259	0.0010	0.0085	0.0357	4.19	1.70	6.20	8.60
	Average	39	S. T.	0.289	0.476	"	"	0.0274	0.0017	0.0203	0.0441	4.51	2.34	6.96	9.30
Total	Highest	77	V. T.	0.299	0.492	Trace	None	0.0588	0.0055	0.0490	0.0943	5.52	[illegible].90	11.60	15.10
	Lowest	34	V. S. T.	0.175	0.289	None	"	0.0152	0.0010	0.0085	0.0288	3.16	1.60	4.70	6.70
	Average	53	S. T.	0.267	0.439		"	0.0298	0.0023	0.0225	0.0495	4.11	2.42	6.77	9.18

T.—Turbid. S. T.—Slightly turbid. V. T.—Very turbid. V. S. T.—Very slightly turbid.

Calculated Yearly Averages of Analyses of Croton Water for 1894, 1895 *and* 1896.

YEAR.	Temperature, Fahrenheit.	Appearance.	Chlorine in Chlorides.	Equivalent to Sodium Chloride.	Nitrogen in Nitrites.	Nitrogen in Nitrates.	Free Ammonia.	Albuminoid Ammonia.	Total Nitrogen.	Hardness before boiling.	Organic and Volatile Matter.	Mineral Matter.	Total Solids.
1894.........	55	S. T...	0.247	0.407	None..	0.0267	0.0013	0.0084	0.0348	4.17	1.77	6.20	7.97
1895.........	54	S. T...	0.258	0.426	None..	0.0250	0.0031	0.0196	0.0436	4.25	2.15	6.39	8.54
1896.........	53	S. T...	0.267	0.439	None..	0.0298	0.0023	0.0225	0.0495	4.11	2.42	6.77	9.18

S. T.—Slightly turbid.

The Croton water appears at intervals to be more or less turbid and to have a "marshy odor."

The systematic "blowing off" of hydrants in all parts of the city at short intervals during the last summer has apparently relieved the conditions very considerably, but as long as we have no means of removing the suspended matter from the water, when every freshet stirring up the Croton Lake, the great settling basin of our water supply system, carries this sediment into our reservoirs and mains, so long will we suffer at times from turbid water, not unwholesome, perhaps, but certainly disagreeable to sight and smell. Many good reasons could be advanced why our water supply should be filtered, and while such a treatment appears to offer engineering problems of great difficulty, and would entail a vast expenditure of money, the benefits which would be derived appear of such importance that it is earnestly hoped that suitable measures be taken in the immediate future to accomplish this.

Phosphates in Croton Water.

As seen from table of analyses, a trace of phosphates was discovered in the Croton water in March and April of last year. As this was very unusual, a very extended investigation was made, both of samples of water taken at various points in the city and from reservoirs, and even to Croton Lake.

I quote from conclusions of the special report made on this subject:

During the years of 1892 and 1893, and during short periods of March and April of this year (1896), phosphates have been present in small amount in the Croton water.

That in each instance when phosphates were present the water was more or less turbid.

Recent experiments go to prove that the phosphates, when present, are in the insoluble form, being in suspension in the water.

That the Croton Lake, the settling basin of the whole water system, has at its bottom a sediment rich in phosphates.

That this sediment, under certain peculiar conditions, as when freshets occur on the water-shed, is washed down into the water-mains of the city, causing the unfiltered water to show the presence of phosphates. That just previous to the occurrence of phosphates in the Croton water in the early part of this year unusual freshets did take place on the water-shed, according to the Chief Engineer of the Aqueduct, and after a period of time, when the turbidity of the water had disappeared, the phosphates disappeared.

Having found that the phosphates were present only in the suspended matter in the water, and having traced their origin to the sediment of the

Croton Lake, we are of the opinion that their presence is of no sanitary significance.

WATERS OTHER THAN CROTON.

During the year a very large number of analyses of water have been made, principally of samples taken by Inspectors in connection with dairy and farm inspections, also of wells and other supplies in the annexed districts. These examinations include waters from wells, cisterns, springs, brooks and lakes. A large number of samples have been found to be contaminated with sewage.

Tank Waters.

Tank waters are examined for the purpose of determining—

(*a*) If water is Croton or artesian well water.

(*b*) When Croton water, if tank requires cleaning.

(*c*) Presence of lead, where sheet lead has been used as a lining.

Mineral Waters.

The following examinations are made of carbonated waters:

(*a*) If made from Croton or artesian well water.

(*b*) In case of analyses being published, complete examination to determine if waters are as represented.

(*c*) Presence of metallic poisons.

Water for character, including waters from cellars and excavations, made in connection with investigations in Chief Sanitary Inspector's Division, to determine origin of the water.

The following table shows the characteristic properties of waters from various sources:

	RIVER WATER.	CROTON.	UNDERGROUND.	SEWAGE.
Odor	Slight	Marshy	Stale	Of sewage.
Chlorides	Very strong	Slight	Strong	Strong.
Calcium Salts	"	"	"	"
Sulphates	"	"	"	"
Free Ammonia	Trace	"	Small amount	Very strong.

Uranine is detected in water by observing color and fluorescence in clear glass tube.

Of the chemical work performed at the request of other City Departments, the most important may be mentioned:

Coroners' Office.

Identification of samples of drugs.

Examination of materials for poisons.

Examination of human viscera in suicide or accidental cases of poisoning only.

Building Department.

Examination of materials used in the construction of sanitary appliances, etc.

District Attorney.

Samples of liquors for alcohol in excise cases.

Department of Public Works.

Samples of water from cellars and excavations, to determine origin of same.

Police Department.

Samples of liquors for alcohol in excise cases.

Examination of materials found on prisoners and suspected of containing narcotics—so-called "knockout drops."

Street Cleaning Department.

Examination of samples of garbage to determine amount of grease and value as a fertilizer.

Special Investigations.

Of the more important special investigations carried on during the year may be mentioned the detection and estimation of phosphates in Croton water and a study of their origin, mentioned under Croton water, and investigation of the water supply of the New York Catholic Protectory at Westchester, New York, as seen by the following report :

NEW YORK, August 3, 1896.

E. W MARTIN, Esq., *Chief Inspector Division of Foods and Offensive Trades :*

SIR—I have the honor to make the following report of the investigations of the water supply of the New York Catholic Protectory, situated in Westchester, New York (Van Ness Station) :

The water supplied at the various places in both the male and female departments is obtained from the following sources—

1. From mains of New York and Westchester Water Company.
2. From wells (eight in number) located at various points on the grounds. On July 31 I took nine samples of water from above premises, representing the various sources of supply, and these samples were examined with the following results :

Samples Nos. 1, 2, 3, 5, 6, 7, 8 and 9 are contaminated with sewage, and their use for all domestic purposes should be discontinued at once.

Sample No. 4 (town supply) appears to be of good quality and is suitable for use for all domestic purposes.

I would respectfully recommend that the use of all well water at the New York Catholic Protectory at Westchester, New York, be discontinued forthwith.

That provisions be made preventing the use of the water from these wells in the future for any and all purposes.

That all tanks, cisterns, reservoirs, coolers, etc., be thoroughly cleansed and disinfected with solution of bromine, made by dissolving one pound bromine in 100 gallons of water (town supply).

That they be flushed with the water of the town supply, and that the town supply (or other pure water supply) be used exclusively.

That all drinking water be filtered until all cases of dysentery have disappeared from the institution.

Respectfully,
ERNST J. LEDERLE, PH. D., *Chemist.*

ANALYSIS NO.	10353	10354	10355	10356	10357	10358	10359	10360	10361
LOCATION. Results Expressed in Parts by Weight in One Hundred Thousand.	(1) Artesian Well, Male Department.	(2) Reservoir, Male Department.	(3) Ditch in Ball Field.	(4) Dining Room, Junior Department.	(5) Stable Well, Female Department.	(6) Female Department, Four Wells in Boys' Yard.	(7) Female Department, Well in Woods.	(8) Female Department, Gents' Well.	(9) Female Department, Artesian Well.
Appearance	T.	S. T.	T.	S. T.	V. S. T.	T.	T.	T.	V. S. T.
Color	V. F. B.	V. F. B.	V. F. B.	L. Y. B.	V. F. B.	V. F. B.	V. F. B.	V. F. B.	V. F. B.
Odor (Heated to 100° Fahr.)	Earthy.	Stale.	Stale.	Marshy.	Earthy.	Stale.	Stale.	Sl. stale.	Earthy.
Chlorine in Chlorides	4.37	3.15	3.15	0.455	1.05	1.73	1.22	3.67	2.97
Equivalent to Sodium Chloride	7.22	5.20	5.20	0.751	1.73	2.31	2.02	6.07	4.91
Phosphates (P_2O_5)	Strong.	Traces.	Trace.	None.	Strong.	Traces.	None.	Trace.	None.
Nitrogen in Nitrites	0.0003	0.0002	0.0005	None.	0.0003	0.0001	0.0001	0.0002	0.0010
Nitrogen in Nitrates	0.0470	0.2446	0.9850	0.0230	0.5600	0.2458	0.0189	0.4809	0.3721
Free Ammonia	0.0120	0.0030	0.0045	0.0020	0.0200	0.0015	0.0270	0.0160	0.0480
Albuminoid Ammonia	0.0050	0.0110	0.0135	0.0160	0.0105	0.0075	0.0200	0.0070	0.0150
Total Nitrogen	0.0613	0.2563	1.0003	0.0372	0.5854	0.2533	0.0577	0.5000	0.4251
Hardness Equivalent to Carbonate of Lime, Before Boiling	14.46	12.00	17.46	4.00	3.00	10.64	8.52	19.39	13.29
Hardness Equivalent to Carbonate of Lime, After Boiling	14.46	12.00	17.46	4.00	3.00	10.64	8.00	19.39	13.29
Organic and Volatile (loss on ignition)	6.50	5.00	5.00	5.00	4.00	8.20	5.00	13.40	8.60
Mineral Matter (non-volatile)	26.30	17.90	32.40	4.60	4.20	17.40	11.00	26.00	21.40
Total Solids (by evaporation)	32.80	22.90	37.40	9.60	8.20	25.60	16.00	39.40	30.00

T.—Turbid.
V. F. B.—Very faint brownish.
S. T.—Slightly turbid.
L. Y. B.—Light yellowish brown.
V. S. T.—Very slightly turbid.
Sl. stale—Slightly stale.

REMARKS.

(1) 600 feet deep.
(2) Underground, top open, 50 feet deep and 30 feet in diameter, receives water from last and probably surface drainage.
(3) Appears to drain an old cesspool full of refuse matter.
(4) Supply of New York and Westchester Water Company.
(5) About 25 feet deep.
(6) 25 feet deep.
(7) 25 feet deep.
(8) 25 feet deep.
(9) 365 feet deep.

Microscopic Exminations.

Examinations of milk and cream for colostrum and starch. Examination of sediment in samples of water, identification of animal and vegetable life. Identification of starches in foods. Identification of poisons.

Experimental Work.

The more important investigations have been :

The detection and estimation of antiseptics in milk, especially boric acid, borax and formaldehyde.

The methods which were found to be satisfactory were adopted and are found under milk and cream. All methods tried for the estimation of boric acid in milk have proved unsatisfactory, and work on this is in progress.

The detection and estimation of phosphates in potable waters. Determination of suspended matter in waters.

1. Character.
2. Quantity.

Respectfully submitted,
ERNST J. LEDERLE, PH. D., *Chemist.*

MERCANTILE ESTABLISHMENTS.

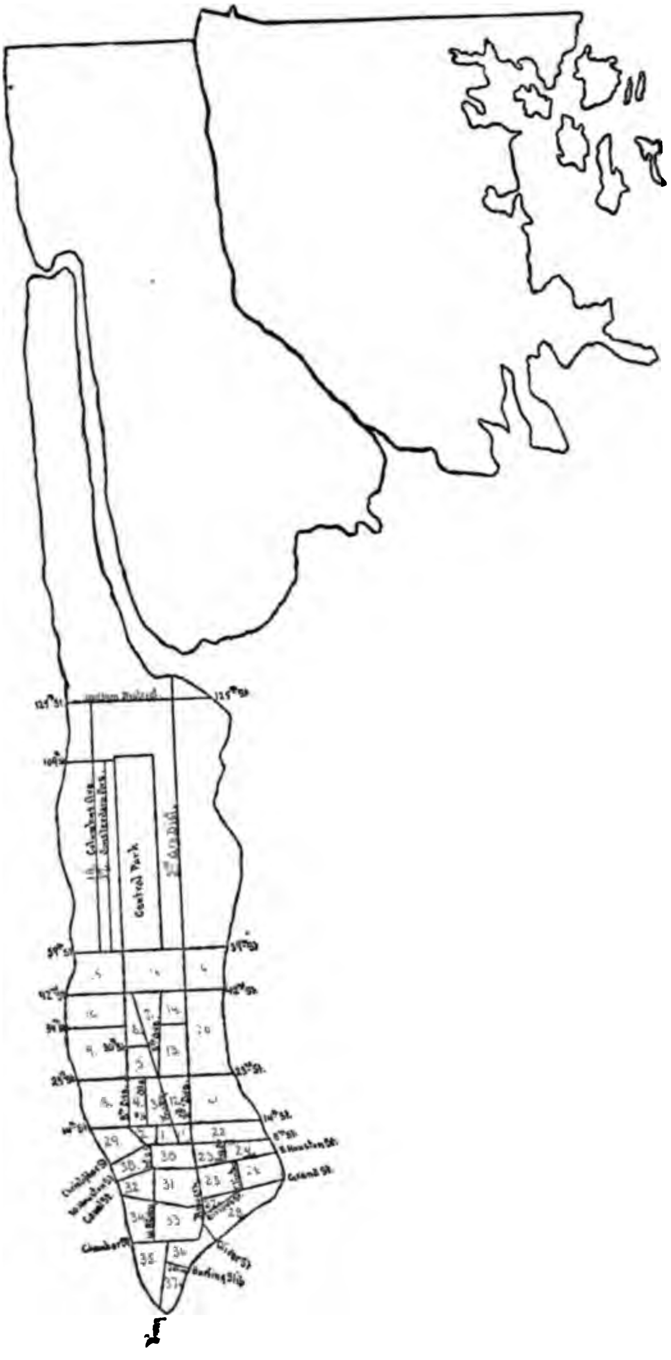
That part of the Division which is charged with the enforcement of the mercantile and factory laws has been, and is, under the direction of Mr. J. J. Koen, Assistant Chief Inspector of this Division ; and the following report submitted by him illustrates the methods employed and the extent of the work accomplished, and will be of great value to other departments charged with similar duties.

The supervision of mercantile establishments, so far as the employment of children and women are concerned, by some competent and reliable branch of the City government, has been a matter of much thought and discussion by those who have taken an interest in the health and surroundings of the working classes, and so important was this matter found to be that, during the last session of the Legislature, certain laws were passed in relation to this (chapter 384 and 991 of 1896), and it became the duty of the Health Department to enforce these laws in the City of New York.

In order to accomplish this it was necessary to devise a method for keeping the records, etc., and while this becomes an easy task where available data is obtainable, yet here was an entirely new field with nothing that could be used as a model.

A system was devised which has been in operation since these laws went into effect, and this system has been found to be absolutely perfect, reliable and rapid in its workings in every detail. It is as follows :

The first step taken after organizing the corps of Inspectors was to divide the city into districts, as shown on the attached map.


125th St.
125th St.
Central Park
10. Columbus Ave.
3rd Ave. Dist.
59th St.
59th St.
42nd St.
42nd St.
34th St.
30th St.
23rd St.
23rd St.
14th St.
14th St.
8th St.
E. Houston St.
Grand St.
Canal St.
Chamber St.
Burling Slip
16
9
8
14
13
20
22
24
29
30
31
32
33
34
35
36
37

A report consisting of a series of questions, involving all the points f the law, was prepared and a copy given to each Inspector, who went om store to store in the district to which he was assigned, and interiewed the proprietor.

The method of inspection of mercantile establishments is as follows:

The Inspector calls on the proprietor and asks him all the questions ontained in the report. If the proprietor refuses the desired information, note of that fact is made by the Inspector, and the owner receives a otice from the Attorney that his refusal to give the information constiutes a misdemeanor. In each case this has resulted in the owner calling r writing at once and expressing himself as willing to give any nformation asked for.

The questions contained in the report are as follows:

Have you any employees under the age of 14 years? Do you employ any females over 21 ears? How many females between the ages of 16 and 21?

How many females between the ages of 14 and 16? How many males between the ages of 14 nd 16? Have all your employees between the ages of 14 and 16 applied for certificates to the oard of Health?

Do you keep a register in which you enter the names of all employees having certificates etween the ages of 14 and 16? During what hours are your premises open for business?

What evenings during the week?

Hours of closing? How much time is allowed your employees for lunch?

Do any of your male employees under the age of 16 work more than 60 hours per week? ny female employees under the age of 16 work over 60 hours per week?

Is the basement occupied? For what purpose? Are women and children employed in the asement? How many?

Have you made application to the Board of Health for a permit to occupy the same? What eating facilities have you provided for the use of the female employees during the hours of mployment?

Is there an average of one seat for every three female employees?

Have you posted three copies, in three different conspicuous places, of chapter 384 of the aws of 1896?

Have you a lunch-room for the employees? State number, location, method of lighting, entilating and cleanliness of each room.

Do lunch-rooms adjoin any urinal or water-closet?

Have you made application to the Board of Health for a permit to use the same? How many ater-closets are provided for your employees?

How many exclusively for the males? How many exclusively for females? State location, ow lighted and ventilated and condition as to cleanliness. Are those used by males wholly eparated from those used by females? Are all water-closets properly screened?

How many wash-rooms are provided? How many for males? How many for females? tate location, light and condition as to cleanliness.

Following the Inspector's signature at the bottom of the report is a pace for any remarks necessary.

These reports are filed away for reference.

When the district has been inspected, notices similar to the one attached are sent to the proprietors of the establishments where violations of the law were reported, calling their attention to the law and quoting the essential parts of the same.

HEALTH DEPARTMENT, CRIMINAL COURT BUILDING,
NEW YORK, September, 1896.

Your attention is respectfully called to chapter 384, Laws of 1896, entitled "An Act to Regulate the Employment of Women and Children in Mercantile Establishments (the words 'Mercantile Establishments' shall be construed to mean any place where goods, wares or merchandise are offered for sale—see section 4 of said Act)," which act takes effect September 1, 1896.

A copy of chapter 384, Laws of 1896, shall be posted in three different conspicuous parts of every mercantile establishment in this State where persons are employed who are affected by the provisions of said act. Such copies will not be furnished by the Health Department.

On and after September 1, 1896, no child between the ages of fourteen and sixteen years shall be employed without first obtaining a certificate from the Board of Health.

A register shall be kept of the number of the certificate issued by the Board of Health, name, birth-place, age and place of residence, of all employees under sixteen years of age.

The said act provides that no male under sixteen years of age, and no female under twenty-one years of age, shall work more than sixty hours in any one week.

Suitable and proper wash-rooms and water-closets to be provided, and water-closets assigned to women and girls to be wholly separate and apart from those assigned to men.

Where lunch-rooms are provided, the same are not to be used without a permit from the Board of Health if they be next to or adjoining any water-closet.

Suitable seats for female employees to be furnished; at least one for every three females employed.

Basements where women or children are employed can be so occupied only after a permit for the same has been granted by the Board of Health.

Forty-five minutes shall be allowed for the noon-day meal in every mercantile establishment.

Personal application for certificates by all children between fourteen and sixteen years of age is required.

Certificates will be issued from the office of the Secretary of the Health Department, in the Criminal Court Building.

By order of the Board of Health.

CHARLES G. WILSON, *President.*

EMMONS CLARK, *Secretary.*

A second inspection of the district is made after a short interval, the proprietor's attention called to all violations noted and informed that the matter must be attended to at once.

A third inspection of the same district is made after another short interval and a memorandum of all violations noted is placed with the Board Attorney for action.

When a permit is desired to employ women or children in the basement of an establishment, the applicant files a full plan of the basement drawn to scale, and an application for the permit. The application is similar to the one attached and is a printed blank form containing questions to be answered regarding the dimensions of all basement rooms, method of light, ventilation, etc.

MERCANTILE ESTABLISHMENTS.

HEALTH DEPARTMENT, CITY OF NEW YORK, CRIMINAL COURT BUILDING,
CENTRE, ELM, WHITE AND FRANKLIN STREETS.

No........ When issued.............................. 189..

Permission is granted to..

to..

....

☞ This permit to be in force until revoked by this Board.

By order of the Board of Health.

....
Secretary.

☞ This permit not transferable.

APPLICATION FOR A PERMIT TO EMPLOY WOMEN AND CHILDREN IN BASEMENTS OF MERCANTILE ESTABLISHMENTS.

Pursuant to the provision of chapter 384, *Laws of* 1896.

REQUIREMENTS FROM APPLICANTS.

....

....

The following facts are required to be stated in Applications for Permits. All permits are granted on the express condition that the statements in the application are true, and that the applicant obeys all orders and ordinances of the Board of Health.

IN ALL CASES—Name and address of applicant and persons interested.

Name............................ Address..

Location of premises for which permit is desired..........................

....

Basement Floor—Number of Rooms.

n .	Length.		Height.		Width.		Floor, of what material	Height of ceiling above sidewalk or adjacent ground.		Height of ceiling below sidewalk or adjacent ground.		Are there areas adjoining basement rooms?	Size of areas. Ft. x Ft.	Is area bottom below or above basement floor, and how much?	
	Ft.	In.	Ft.	In.	Ft.	In.		Ft.	In.	Ft.	In.			Ft.	In.
...	....	....	....	....	....	....	....	......	......	......	......	....	....	....	....
...	....	....	....	....	....	....	....	......	......	......	......	....	....	....	....
...	....	....	....	....	....	....	....	......	......	......	......	....	....	....	....
...	....	....	....	....	....	....	....	......	......	......	......	....	....	....	....

Light and Ventilation.

n .	No. of windows.	Size of windows.		No. of windows opening to external air.	No. of windows opening on shaft.	Is artificial light necessary during the day?	Character of artificial light used.	Are fans used to ventilate room? If so, give number and capacity.	Other means of light and ventilation.
		Ft.	In.						
...	....	....	....	....	....	....	....	....	....
...	....	....	....	....	....	....	....	....	....
...	....	....	....	....	....	....	....	....	....
...	....	....	....	....	....	....	....	....	....
...	....	....	....	....	....	....	....	....	....
...	....	....	....	....	....	....	....	....	....

Are there interior light courts?............If so, give dimensions, and state whether open
osed on top..

....

Is there a cellar beneath basement floor?...........If so, give height from floor to ceiling,
haracter of cellar floor. ....

....

Wash-rooms and Water-closets.

Location and number of wash-rooms and water-closets.................................
Are those assigned to females wholly separate and apart from those assigned to males?......
Are the water-closets completely screened and ventilated?...............................
How are water-closet compartments ventilated and lighted?............................
....
Give location of lunch-room with reference to water-closets.............................
....

Name of Applicant.......................................
Address.......................................

When the plan and application is filed an Inspector is sent to the mises to make a full report and recommendation as to whether the lication should be granted or not. The method of handling an applion for a permit to use a certain room as a lunch-room is the same, epting a plan is not required.

A child between 14 and 16 years desiring a certificate of employnt in a mercantile establishment, receives upon personal application blank forms, one is termed an "Application" and contains, besides form of application to the Board of Health for a certificate of employnt to be filled out and signed in ink by the child, a form of affidavit to made by the father, mother or one who stands in parental relation to child.

The affidavit contains the date and place of birth of the applicant. The other blank furnished the child is termed a school blank and contains three blank forms.

(MERCANTILE ESTABLISHMENTS.)
HEALTH DEPARTMENT, CRIMINAL COURT BUILDING,
NEW YORK, ..., 189..

To the Board of Health, City of New York:

GENTLEMEN—Application is hereby made for a Certificate of Employment by the undersigned, ..he being physically able to perform the duties of* ....
....

(Signature of Applicant)..................................
(Address)..................................

Affidavit of Parent, Guardian or Person Standing in Parental Relation to the Applicant.
(Extract from Section 3, Chapter 384, Laws of 1896.)

SEC. 3.—It shall be unlawful for any notary public or other officer authorized or empowered to administer to any person an oath, to demand or receive a fee for taking or administering an oath to a parent or guardian or a person in parental relation to any child, as to the age of such child, where the affidavit is used or intended to be used for the purpose of obtaining a certificate, as provided for in the foregoing section, from any board or department of health, or health commissioner or commissioners as therein set forth.

STATE OF NEW YORK,
CITY AND COUNTY OF NEW YORK, } ss:

....
residing at.......................... in the.......................State of..............
being duly sworn, says that ..he is (father, mother, guardian, or stands in parental relation to the above-named applicant); that said applicant was born at................in................
on the......day of............in the year 18....

(Signature)................................

Sworn to before me this......day
of.................. 189.. }
...........................*Notary Public.*

CERTIFICATE OF INSPECTOR.

To the Board of Health, City of New York:

GENTLEMEN—I hereby certify that...
has complied with all of the provisions of chap. 384, Laws of 1896; that the date of birth (is correctly stated—cannot be ascertained); that after careful examination I am satisfied that said applicant is fourteen years of age or upward, and is physically able to perform the duties of*
....
....for which..he has made application. And I hereby further certify that I am satisfied that said child has regularly attended upon instruction at a school, in which at least the common branches of reading, spelling, writing, arithmetic, English grammar and geography are taught, or upon equivalent instruction by a competent teacher elsewhere than at a school, for a period equal to one school year; that is to say, to as many days as the public school of the city or school district in which such child resides was in session during the last preceding school year; or to as many days as the public school of the city or town where such child is about to be employed was in session during the last preceding school year.

....
Inspector.

Dated....................189..

INFORMATON AS TO APPLICANT.

Name, ... Residence,...................................
Age,.......yrs.,......mos.,.......days. Height, ...ft.,.......in. Weight,......lbs.
Date of Birth,.............................. Place of Birth.................................
Color of Hair,............................. Color of Eyes,................................

Facial Marks.

....

REMARKS.

....
Application No............................ Filed,.................................189..
Certificate dated.......................189.. Certificate No......................................

---

*The designation "Junior Helper" includes the positions (male and female) known as "Minor Sales," "Cash." "Messenger," "Errand," "Small Parcel Wrapper," "Stock," the duties of the above designations being those usually performed by such employees in "Mercantile Establishments."

Application No........

MERCANTILE—MANUFACTURING.

HEALTH DEPARTMENT, CITY OF NEW YORK,
CRIMINAL COURT BUILDING.

SCHOOL CERTIFICATES.

(To be signed by a principal, an executive officer of any school, or by a teacher elsewhere than in a school.)

Extract from section 2, chapter 384, Laws of 1896, "To regulate the employment of women and children in mercantile establishments"; and from section 2, chapter 991, Laws of 1896, "To regulate the employment of women and children in manufacturing establishments."

Sec. 2. * * * It shall be the duty of the principal or the executive officer of any school, or of a teacher elsewhere than at a school, to furnish upon demand to any child who has attended upon instruction at such school, or by such teacher, or to furnish to the board or department of health, or health commissioner or commissioners of any city or town, a certificate stating the school attendance by such child.

Certificate of School Session.

To the Board of Health, City of New York:

GENTLEMEN—I hereby certify that................school........located at..............
in the............of..............State of.................., was in session............days
during the last preceding school year, ending........................189..

(Signature)....................................

Dated.........................189..

(Official Designation)...........................

Certificate of School Attendance.

To the Board of Health, City of New York:

GENTLEMEN—I hereby certify that...residing
at.....................in the............of..................attended..................
school..............situated at..................in the................of.................
State of.....................; that the school attendance of said..................during the
school year ending.......................189.., amounted to...........days; that reading,
writing, spelling, arithmetic, English grammar and geography were regularly taught in said school.

(Signature)....................................

Dated.........................189..

(Official Designation)...........................

Certificate of Special Instruction.

To the Board of Health, City of New York:

GENTLEMEN—I hereby certify that...residing
at.....................in the............of.....................State of...............
has received the benefit of instruction in reading, writing, spelling, arithmetic, English grammar and geography, or equivalent instruction, by a competent teacher, elsewhere than at a school, to
wit: at...................in the............of..................State of................;
that during the year ending..................189.., ...days of instruction were given.

(Signature)....................................

Dated.........................189..

(Official Designation)...........................

The first form is called a Certificate of School Session, to be filled out by the principal of the school where the child attended, giving the number of school days in the last preceding school year.

The second form is termed a Certificate of School Attendance, and is also to be signed by the principal or vice-principal of the school where the child attended, and giving the full school attendance of the child.

The last form is a Certificate of Special Instruction, and is filled out by a teacher who has given instruction to the child elsewhere than at a school.

A child to be eligible for a certificate must be between the ages of fourteen and sixteen years, and must have attended a school at least 203 days, which is the number of days during which the public schools of this city were in session during the school year ending June, 1896; and must be able to read and write simple sentences in the English language.

In the school the child attended instructions must be given in reading, writing, spelling, arithmetic, English grammar and geography.

When the child has returned with the above papers properly filled out, one of the two Inspectors, both of whom are physicians detailed in the office, examines the papers and fills out, on the back of the application, a blank form of identification of the child, giving the name, residence, age, height, weight, date and place of birth, color of hair, color of eyes and the facial marks and any remarks necessary.

On the face of the application blank is a form termed Certificate of Inspector, in which the examining Inspector certifies to the fact that the child has complied with all the provisions of chapter 384, Laws of 1896, that the date of birth is correctly stated—cannot be ascertained; that after careful examination she is satisfied that said applicant is fourteen years or upward and is physically able to perform the duties of junior helper, for which he or she has made application.

The Inspector further certifies that he is satisfied that said child has regularly attended upon instruction at a school, in which, at least the common branches of reading, writing, spelling, arithmetic, English grammar and geography are taught, or upon equivalent instruction by a competent teacher elsewhere than at a school, for a period equal to one school year; that is to say, to as many days as the public schools of the city or school district in which such child resides was in session during the last preceding school year, or to as many days as the public school of the city or town where such child is about to be employed was in session during the last preceding school year. The certificate is signed and dated by the Inspector.

A certificate of employment, as shown below, is now made out.

CERTIFICATE OF EMPLOYMENT, MERCANTILE ESTABLISHMENTS.

HEALTH DEPARTMENT, CITY OF NEW YORK,
CRIMINAL COURT BUILDING,
NEW YORK..................................189....

No.........

The Health Department of the City of New York hereby Certifies:

That..................................has complied with all the provisions of chapter 384, Laws of 1896, and is qualified for employment in any mercantile establishment in this city, in the position herein designated; and further certifies that he is physically able to perform the work which he intends to do, as*..and further certifies that the date of birth in this certificate is correctly stated, or cannot be ascertained, and that, after careful examination, it is satisfied that said child is fourteen years of age or upward.

Name.................................. Date of Birth..................................
Residence.............................. Place of Birth................................
Color of Hair.......................... Color of Eyes................................
Height..............feet...........inches. Weight..............pounds.
Facial Marks..
....

By order of the Board of Health.

CHARLES G. WILSON,
President.

EMMONS CLARK,
Secretary.

Countersigned..
Inspector.

....
Signature of person named in above Certificate.

---

*The designation "Junior Helper" includes the positions (male and female) known as "Minor Sales" "Cash," "Messenger," "Small Parcel Wrapper," "Errand," "Stock," the duties under the above designations being those usually performed by such employees in mercantile establishments.

The certificate, after being signed by the child, is examined and signed by the Chief Inspector, given to the child and becomes his own personal property.

The small form of affidavit attached is to be made by the parent, guardian or one who stands in parental relation to the child, and gives the full length of attendance at any school and the name and location of the school. This affidavit is used only in a case where the applicant has attended school outside of the city, in which case it would, of course, be difficult for the applicant to get the regular certificate of school attendance from the principal of the school.

Application No........

HEALTH DEPARTMENT,
CRIMINAL COURT BUILDING.

STATE OF NEW YORK,
CITY AND COUNTY OF NEW YORK, ss.: ....

being duly sworn, says that he resides at..........................in the.................. State of..........................., and that he is the father, mother, guardian, or stands in parental relation to..., an applicant to the Health Department for a certificate of employment under chapter 384, Laws of 1896, or chapter 991, Laws of 1896; and deponent further says that said.................................has been employed for the past............ ...., and that previous to such employment had received the benefit of instruction in reading, writing, spelling, arithmetic, English grammar and geography at school, to wit:.. or equivalent instruction by a competent teacher elsewhere than at a school.................... ....for a period not less than....................days.

....

Sworn to before me this..............day
of.................189....

....
Notary Public.

The form of application for a certificate of employment in a manufacturing establishment and the certificate itself is similar to those for a mercantile establishment, except that they are printed on a different colored paper. This Department, under chapter 991, Laws of 1896, does not inspect factories, but when a child applies to the Department for a certificate, after having filed all the necessary papers, the certificate is issued and all further responsibility of the Department ceases.

A child who has not attended school, but can read and write simple sentences in the English language, can, upon filing the usual application and affidavit as to the age, receive, if 12 years of age or over, a certificate of employment in a mercantile establishment. These certificates are good only during the vacation of the public schools of this city, and are termed "Vacation Certificates."

VACATION CERTIFICATE—MERCANTILE ESTABLISHMENTS.

HEALTH DEPARTMENT, CITY OF NEW YORK,
CRIMINAL COURT BUILDING,
NEW YORK..................189....

No........

(Extract from section 2, chapter 384, Laws of 1896.)

"Section 2. It shall be unlawful for any proprietor, agent, foreman or other person in or connected with a mercantile establishment to hire or employ any child under the age of fourteen years, to whom such 'vacation certificate' only has been issued, at any time other than the time of the school vacation of the public school in the city or school district where such child resides, or, if it be a non-resident, at any time other than the time of the school vacation of the public school in the city or school district where such mercantile establishment is situated."

The Health Department of the City of New York hereby certifies that.................. has complied with all the provisions of chapter 384, Laws of 1896, and is qualified for employment in any mercantile establishment in this city, in the position herein designated; and further certifies that he is physically able to perform the work which he intends to do, as*............... and further certifies that the date of birth in this certificate is correctly stated, or cannot be ascertained, and that, after careful examination, it is satisfied that said child is twelve years of age or upward.

Name.................................. Date of Birth..........................
Residence.............................. Place of Birth..........................
Color of Hair.......................... Color of Eyes..........................
Height............feet............inches. Weight............pounds.
Facial Marks...

By order of the Board of Health,

CHARLES G. WILSON,
President.

EMMONS CLARK,
Secretary.

Countersigned ....
Inspector.

....
Signature of person named in above Certificate.

---

* The designation "Junior Helper" includes the positions (male and female) known as "Minor Sales," "Cash," "Messenger," "Small Parcel Wrapper," "Errand," "Stock," the duties under the above designations being those usually performed by such employees in mercantile establishments.

MERCANTILE ESTABLISHMENTS.

VACATION.

HEALTH DEPARTMENT,
CRIMINAL COURT BUILDING,
NEW YORK..................189....

To the Board of Health, City of New York:

GENTLEMEN—Application is hereby made for a Certificate of Employment by the undersigned, he being physically able to perform the duties of*......................................

Signature of Applicant..
Address..

---

* The designation "Junior Helper" includes the positions (male and female) known as "Minor Sales," "Cash," "Messenger," "Errand," "Small Parcel Wrapper," "Stock," the duties of the above designations being those usually performed by such employees in "Mercantile Establishments."

Affidavit of Parent, Guardian or Person Standing in Parental Relation to the Applicant.

(Extract from section 3, chapter 384, Laws of 1896.)

"Sec. 3.—It shall be unlawful for any notary public or other officer authorized or empowered to administer to any person an oath, to demand or receive a fee for taking or administering an oath to a parent or guardian or a person in parental relation to any child as to the age of such child, where the affidavit is used or intended to be used for the purpose of obtaining a certificate as provided for in the foregoing section, from any board or department of health, or health commissioner or commissioners as therein set forth."

STATE OF NEW YORK,
CITY AND COUNTY OF NEW YORK, } ss. :

....residing..
being duly sworn, says that he is (father, mother, guardian, or stands in parental relation) to the above-named applicant; that said applicant was born at..
in...................................on the........day of..
in the year 18......

(Signature)..

Sworn to before me this..............
day of..................189 }

....
Notary Public.

Certificate of Inspection.

To the Board of Health, City of New York:

GENTLEMEN—I hereby certify that.................................has complied with all of the provisions of chapter 384, Laws of 1896; that the date of birth (is correctly stated—cannot be ascertained); that after careful examination I am satisfied that said applicant is 12 years of age or upward, and is physically able to perform the duties of.. for which he has made application.

....
Inspector.

Dated.........................189
Name.............................. Date of Birth...........................
Residence.......................... Place of Birth..........................
Age....... years......months......days. Color of Hair...........................
Height....feet....inches. Weight....lbs. Color of Eyes...........................
Facial Marks...

REMARKS.

Application No ....Filed......................189
Certificate dated.......................189............Certificate No.....................

In case of children applying for vacation certificates in manufacturing establishments, in accordance with chapter 991, Laws of 1896, the same method is pursued in reference to form of application, record, etc., but the children must be at least 14 years of age and be accompanied by the parents or guardian, and the affidavits with regard to the ages must be made at this office.

VACATION CERTIFICATE—MANUFACTURING ESTABLISHMENTS.

HEALTH DEPARTMENT, CITY OF NEW YORK,
CRIMINAL COURT BUILDING,
NEW YORK..................189....

No........

The Health Department of the City of New York hereby certifies that.................... ....has complied with all the provisions of chapter 991, Laws of 1896, and is qualified for employment in any manufacturing establishment in this city, in the position herein designated; and further certifies that he is physically able to perform the work which he intends to do, as .... and further certifies that the date of birth in this certificate is correctly stated, or cannot be ascertained, and that, after careful examination, it is satisfied that said child is fourteen years of age or upward.

Name.................................. Date of Birth ....
Residence.............................. Place of Birth...........................
Color of Hair.......................... Color of Eyes...........................
Height.............feet............inches. Weight................pounds.
Facial Marks...

By order of the Board of Health,

EMMONS CLARK,
Secretary.

CHARLES G. WILSON,
President.

Countersigned ....
Inspector.

....
Signature of person named in above Certificate.

MANUFACTURING ESTABLISHMENTS.

VACATION.

HEALTH DEPARTMENT,
CRIMINAL COURT BUILDING,
NEW YORK..................189....

To the Board of Health, City of New York:

GENTLEMEN—Application is hereby made for a Certificate of Employment by the undersigned, he being physically able to perform the duties of..

(Signature of Applicant)..
(Address)..

Affidavit of Parent, Guardian or Person Standing in Parental Relation to the Applicant.

(Extract from section 2, chapter 991, Laws of 1896.)

"Sec. 2—It shall be unlawful for any notary public or other officer authorized or empowered to administer to any person an oath, to demand or receive a fee for taking or administering an oath to a parent or guardian, or a person in parental relation to any child as to the age of such child, where the affidavit is used or intended to be used for the purpose of obtaining a certificate as provided for in the foregoing section, from any board or department of health, or health commissioner or commissioners, as therein set forth."

STATE OF NEW YORK,
CITY AND COUNTY OF NEW YORK, } ss:

....

residing at....................................in the................State of............ being duly sworn, says that he is (father, mother, guardian, or stands in parental relation to the above-named applicant); that said applicant was born at.....................in.............. on the.................day of.....................in the year 18....

(Signature)..................................

Sworn to before me this...........
day of.................189

....
Notary Public.

Certificate of Inspector.

To the Board of Health, City of New York:

GENTLEMEN—I hereby certify that ....has complied with all of the provisions of chapter 991, Laws of 1896; that the date of birth (is correctly stated—cannot be ascertained); that after careful examination I am satisfied that said applicant is fourteen years of age or upward, and is physically able to perform the duties of........................ for which he has made application. And I hereby further certify that I am satisfied that said child can read and write simple sentences in the English language.

....
Inspector.

Dated..............................189....

Information as to Applicant.

Name................................. ..	Date of Birth ....
Residence..............................	Place of Birth............................
Age.......years.......months.......days.	Color of Hair ....
Height....feet....inches. Weight.....lbs.	Color of Eyes ....

Facial Marks...

REMARKS.

....
....

Application No..................................Filed 189
Certificate Dated......................... 189 Certificate No.................. ......

For the purpose of keeping a record of the children's applications and certificates, a card index system is used, in the following manner:

Three differently colored cards—salmon, blue and white—are used. When the application of a child who has applied for a mercantile certificate and who will become 16 years in April, 1899, is granted, a white card, per sample—

Ap

Name	Application No.
Residence	Certificate No.
Date of Birth	
Remarks ○ Mercantile	[WHITE CARD.]

—is selected, with the month printed on a tab on the upper edge, and the name, residence, date of birth, application number and certificate number is entered, together with any remarks necessary.

If the child will become 16 years of age in April, 1898, a salmon-colored card would be used, as per sample:

Ap

Name	Application No.
Residence	Certificate No.
Date of Birth	
Remarks ○ Mercantile	[SALMON-COLORED CARD.]

If the child will become 16 years of age in April, 1897, a blue card, as per sample, is used:

Ap

Name	Application No.
Residence	Certificate No.
Date of Birth	
Remarks ○	[BLUE CARD.]

The cards are filed away in cabinets in alphabetical order for reference. The object of different colors for different years is that the cards for all children who have reached their sixteenth year can be rapidly removed from the cabinet and filed away for future reference.

If there is any question about a child who has applied for a certificate, when the name is given, the card is found in the cabinet, and from that the application, which gives the full history of the case.

The record of applications refused is kept in the same manner as for those granted.

In keeping the records of the applications for certificates in manufacturing establishments, the same system is used as for those in mercantile establishments; but the colors of the cards are different.

When a complaint is received against a mercantile establishment, an Inspector is sent to examine the premises and make a full report of the sanitary condition of the establishment, and note any violations of the law. On the Inspector's report, a notice is served on the proprietor and in five days a re-inspection is made of the premises, and, if the law has not been complied with, the Attorney of the Board takes steps to commence proceedings to enforce the law.

On January 1, 1897, thirty (30) districts, entered in table below and shown on the map, were completed:

Table Showing Number of Districts, Number of Mercantile Establishments, Number of Women and Children Employed, etc.

DISTRICT.	Mercantile Establishments.	Mercantile establishments in which women and children are not employed.	Mercantile establishments in which women and children are employed.	Females over 21 years of age.	Females between 16 and 21 years.	Females between 14 and 16 years.	Males between 14 and 16 years.	Basements where women and children are employed.	Basements where permits were issued to employ women and children.	Establishm'ts where copies of the law were posted.	Establishm'ts where seats were provided for females.	Number of children under 14 years of age found employed.
1..........	164	100	64	567	228	61	91	4	3	10	60	..
2..........	310	221	89	1,247	1,090	576	164	9	3	4	72	..
3..........	507	260	247	2,038	1,322	195	425	24	15	5	226	..
4..........	319	190	129	1,926	810	357	172	9	3	3	111	5
5..........	528	396	132	244	89	4	41	7	2	5	119	2
6..........	365	288	77	110	73	24	33	3	1	..	48	1
7..........	264	178	86	516	151	10	21	10	6	1	83	1
8..........	328	297	31	33	6	5	12	..	..	1	21	2
9..........	495	455	40	15	17	..	18	2	..	..	16	..
10..........	447	381	66	93	98	20	18	1	..	..	53	3
11..........	141	105	36	74	46	2	4	..	..	..	33	..
12..........	400	286	114	373	83	6	31	6	..	1	92	2
13..........	512	383	129	181	86	8	32	23	..	..	113	2
14..........	218	160	58	46	30	..	14	6	..	..	37	3
15..........	1,078	983	95	125	86	36	26	3	..	4	71	1
16..........	976	777	199	268	90	5	53	6	1	2	174	2
17..........	491	349	142	166	95	10	32	4	3	..	117	2
18..........	534	408	126	80	62	12	35	5	1	..	74	16
19..........	641	593	48	23	26	1	12	2	..	..	37	..
20..........	865	746	119	62	60	5	27	9	..	..	91	4
21..........	481	421	60	19	43	4	8	..	..	..	51	2
22..........	894	794	100	47	46	11	23	1	..	..	67	5
23..........	807	688	119	66	74	16	43	2	..	1	90	4
24..........	982	888	94	27	34	7	17	2	..	..	59	12
27..........	1,160	1,056	104	309	379	82	62	9	2	1	95	1
1st avenue.	840	689	151	60	95	12	23	..	..	1	121	7
2d avenue.	958	841	117	36	60	4	30	3	..	1	82	6
3d avenue.	716	489	227	704	1,018	172	65	9	8	4	198	1
8th avenue	491	414	77	58	59	22	21	2	..	..	41	4
Harlem...	98	52	46	245	223	57	31	6	3	2	44	..
Total	17,010	13,888	3,122	9,758	6,581	1,724	1,584	167	51	46	2,596	88

The following table shows the number of applications made for mercantile certificates, applications refused, etc. :

Table Showing Number of Applications Made for Mercantile Certificates, Number of Applications Granted, Refused, Etc.

Total No. Applications Made.	No. of Applications Granted and Certificates Issued.	No. of Applications Refused.	Reason for Refusing.
4,785	4,525	112	Under age.
		120	Over age.
		22	Insufficient tuition.
		6	Physical disability.

The following table shows the number of applications made for manufacturing certificates, applications refused, etc. :

Table Showing Number of Applications Made for Manufacturing Certificates, Number of Applications Granted, Refused, Etc.

Total No. Applications Made.	No. of Applications Granted and Certificates Issued.	No. of Applications Refused.	Reason for Refusing.
1,682	1,333	56	Under age.
		132	Over age.
		26	Insufficient tuition.
		3	Physical disability.
		132	Insufficient education.

FRUIT AND FOOD INSPECTION.

In fruit and food inspections the results obtained during the past year have been very satisfactory. Great attention was paid to that part of the city south of Houston street and east of the Bowery, by causing daily nspections to be made beside the bi-weekly ones, as in former years. The result is that this section, particularly in those streets in which a market is held on Tuesdays and Fridays, will compare favorably with many parts of the city, either in cleanliness or the quality of the food exposed for sale. The wholesale and commission houses have been carefully watched in order to prevent the carting away of unsound and decayed fruit and vegetables by venders, who, watching their opportunity, seize such goods and later expose them for sale in those parts of the city mentioned above.

Great pains were taken to prevent the sale of unripe fruits in the early summer—a favorite penny's worth being an unripe pear or apple of small size, often almost as hard as wood, placed upon a sliver of wood and dipped in thickened molasses. The seizure of the goods and the subsequent arrest of the venders soon prevented this. The candies exposed for sale are generally of good quality, not a single case of adulterated candy or candy colored with poisonous colors being found; for while some of these colors appear to be harmful from the bright greens and reds used, yet it was found that only analine colors, which were harmless, had been employed.

During the year great attention has been paid to the inspection of markets, ice-cream makers and restaurants, as to their condition and location of utensils, etc.; many cases were found where the ice-box was tapped directly into the sewer or water-closet.

The Inspection of Fruits and Foods.

One Inspector is detailed to inspect all fruit, vegetables and foods sold in commission houses and auction houses, wholesale markets and stores and at all railroads and steamship lines.

Two are detailed to inspect retail stores and stands, venders' wagons, etc.

Suitable books are provided for recording the work, as in illustrations.

Date........................Hour.............
Street and Number.........................
Name of Owner.........................
Business.................................
From whom Purchased.......................
Condition of Store..........................
Condition of Ice Box.......................
....

Condemned.

Character.	Pounds.	Total.
....	....	....
....	....	....
....	....	....
Total	....	....

No. of Inspection..............................
REMARKS.

The Inspector for the wholesale dealers, etc., makes a regular round from day to day, and as he is conversant with the time and place of arrival of all steamers, vessels, and at railroads, arranges his work so that all are visited at the proper time, as far as he can without assistance, and so systematized has this work become that very little unripe or unwholesome fruit escapes his vigilance.

The Inspectors for the retail stores, etc., two days in the week make inspections, accompanied by officers and a cart, in that part of the city east of the Bowery and south of Houston street, in which regular markets are held on Tuesdays and Fridays; also on Ninth avenue, between Thirty-sixth and Forty-second streets, on Saturday nights from 7 to 11 or 12 P. M.; also at all retail market stands, etc., as often as possible.

During each year every bakery and ice-cream manufactory is also examined as to the condition, cleanliness of utensils, etc., location of closets and urinals, whether working rooms are occupied as sleeping apartments, etc.; also restaurants, to ascertain condition of the ice-box, how trapped, etc. This last is of great importance, as cases have been found where the waste-pipe from box consisted of a short straight pipe opening into the bowl of a hopper closet located on the other side of a thin partition. The owner had noticed many croton bugs in the ice-box, but could not ascertain where they *obtained access.*

Also to examine the ice-boxes in grocery stores, etc. (section 32 of Sanitary Code), as to exposing meat outside of stores, is more particularly under their supervision.

They all make weekly reports, which are handed in at Headquarters on Mondays at 9 A. M. One of them reporting every day as well, for such special complaints or investigations as may be required.

In conclusion, I can state that the quality of the fruit and food exposed for sale has improved greatly during the past year, for while the force has remained the same as the previous year, yet greater experience as enabled the Inspectors to accomplish more; and the work has been ushed and supplemented by assistance from the other Inspectors of this ivision who, in summer and hot weather, do what they can to prevent he sale of improper fruit while on the rounds of their ordinary duties.

The fruit and food supply of New York City is obtained from all parts f the United States, and from nearly all the tropical and semi-tropical arts of the world.

It is impossible to even approximate the receipts of canned goods; no ecords are kept of them and they arrive in every conceivable manner—by ll railroads, boats and by express. The largest canned goods brokers in he city inform me that the closest estimate would be over one million ases out of the way, but they feel that ten to fifteen million cases would ot be amiss.

The principal place of shipment is from Chicago; the stock goods canned meats) and nearly everything in the edible line is canned, and so he industry is a very large one.

The fruits and vegetables are brought into the city as follows:

Bananas—Arrived during the year, 3,546,419 bunches. They are shipped from Port Limon, luefields, Livingston, Honduras (Central America); Bocas del Toro, Aspinwall and Santa artha (South America); the Islands of Jamaica and San Domingo and from Cuba, the Provinces f Banes, Giebira and Baracoa. No fruit has been shipped from Cuba since last August, on account f the insurrection. They arrive at the following points: Piers 1 and 3, Canal street and foot of est Twenty-seventh street, North river; and Piers 10, 11, 12, 13 and 14, East river.

Oranges—Shipped from Jamaica, West Indies, 190,000 barrels and boxes; Mexico, 1,500 oxes; Cuba, 12,000 barrels; California, 28,000 boxes (domestic); Mediterranean ports, 507,600 oxes; the Continent of Europe, by mail steamers, 126,617 cases; Florida, 2,000 (domestic). ery few have arrived from Florida, for, during the frost of two years ago, the crops were prac-cally destroyed, and it takes five years for an orange tree to bear.) Making a grand total of 67,717 barrels and cases. They arrive as follows: At Pier 1, North river; Pier 6, North river; merican Line, Lehigh Valley Railroad and Savannah Line, all North river; Piers 10, 14 and ard's Steamship Company and Clyde Line, East river.

Grape Fruit—Nearly all comes from Jamaica; a few from Florida and California; 9,000 arrels and boxes total shipments. Points of arrival, Pier 1 and Canal street, Pennsylvania Rail-ad and Savannah Line, North river; Clyde Line and Pier 14, East river.

Lemons—Nearly all shipped from Mediterranean ports; a few from California, Florida and pain. 2,060,000 boxes arrived, of which 2,051,000 came from Mediterranean ports, viz.: Messina nd Italy. Arrived nearly all at Brooklyn, but some at Cunard, American and White Star Lines, ew York.

Almeria Grapes—Almeria grapes (commonly called Malagas) all come from Spain, and early all land in Brooklyn, but all are sold in New York by Brown & Secomb and Goodsell Fruit ompany. Arrivals, 165,000 barrels.

Pineapples—Shipped principally from Cuba and Bahama Islands, with a few from Jamaica nd Florida. Arrivals, 119,023 barrels, 5,000 cases and 28 schooners. Barrels will average 100 ach, cases 60 and schooners 7,000 dozen. Of these Florida and Jamaica produce about 2 per cent. he bulk arrive at Ward's Steamship Company and Piers 13 and 14, East river, and Pier 10 panish line); balance by Clyde and Savannah lines and Pennsylvania Railroad; making a grand tal of loose pineapples of 14,574,300.

Pomegranates—Shipped from Jerusalem and Spain, about 3,500. Land at mail docks. Here-ter mail docks will be known as American, French, Cunard and White Star lines.

Onions—Shipped from Egypt and Bermuda in bags and cases; about 7,000 bags from Egypt nd 40,000 from Bermuda. Land at pier foot of West Tenth street and in Brooklyn. A few trans-ipped on other side and land at mail docks.

Figs and Dates—Shipped from Persia, Turkey and Italy, 12,000 cases.

Raisins—Shipped from Spain and Italy, 65,000 cases. Figs and dates and some raisins nd at mail docks; balance of raisins in Brooklyn.

Potatoes—Shipped from Scotland; usually the Anchor and Allan lines carry them as ballast nly in the fall of the year. A few arrive from Nova Scotia; 1895 and 1896 from Scotland, 30,000 ags; Nova Scotia nearly all in bond and thence transshipped to Cuba. The steamer stops at

New York to take on other cargoes. Arrive at foot of West Twenty-second and Twenty-fourth streets. This takes in about all of the importations. A few domestic items are classed in the foregoing statistics for convenience sake only, but not enough to affect the importations.

Domestic Fruits and Vegetables.

They are shipped in general from all parts of the United States east of the 85 meridian, which on the north is Michigan, and south the western boundary line of Georgia. The only exception to this is California and Oregon.

Apples—During the year 951,086 barrels arrived; evaporated apples, 164,845 crates. The bulk came from this State. They land at all railway companies' piers, viz.: Pennsylvania Railroad, Piers 24 and 29; Lehigh Valley Railroad, Pier 3; Central Railroad of New Jersey, Pier 15; Delaware, Lackawanna and Western, Pier 21; New York Central, Pier 27; Baltimore and Ohio, Jay street; West Shore Railroad, Harrison street, and Old Dominion Steamship Company.

Cranberries—Shipped from New Jersey and Cape Cod, Massachusetts. Amount received, 43,817 barrels and 55,761 crates. Reach New York by all routes, principally Fall River Line.

Dried Fruits Other than Evaporated Apples—All dried fruits other than evaporated apples, 715,269 packages; arrive by all routes.

Berries, all kinds, Miscellaneous—Including strawberries, blackberries, huckleberries, pears, peaches, plums and all small fruits not otherwise mentioned. They are shipped as follows: Strawberries, Florida, the Carolinas, Virginia, New Jersey and Middle States; the other fruits come from the same places, except the majority of peaches, which come from Delaware and New Jersey. They land at all piers and express depots. Total, about 4,000,000 packages.

Watermelons—Shipped from Florida, Georgia, the Carolinas, Virginia and New Jersey. Principal points of arrival are Savannah and Old Dominion Steamship Companies' lines and Pennsylvania Railroad; other points, Baltimore and Ohio and Central Railroad of New Jersey. Total shipments, 1,681,179 melons.

Musk Melons—Shipped from same points as watermelons. Arrive mostly via Pennsylvania Railroad; number of barrels and crates, 8,000.

California Fruits—This industry is about six years old. The word California in this instance means California, Oregon and Arizona; about three per cent. come from Oregon and one-half per cent. from Arizona. The fruit dealers of the west have an arrangement so that all the fruit shall be shipped by one line (the Erie, Pier 20, North river). The California dried fruits come by the Southern Pacific, thence by Morgan line from New Orleans, and land at Pier 45, North river. All green fruits are sold by auction daily on Pier 20, North river, at 9 A. M. The receipts this year are the heaviest in the history of the California trade; total receipts, 2,700 cars, averaging 700 packages to the car, or 1,890,000 packages. This includes grapes, pears, peaches, cherries, plums, apricots and nectarines in great variety.

Grapes—Nearly all the grapes come from New York State, princpally Hammondsport. They are landed at the places mentioned for small fruits, but mostly Erie Railroad, Pier 21, North river. Amount, 1,500,000 baskets, and 700 car-loads of wine grapes, which are shipped in trays, about 600 to car; amount, 420,000 trays.

Cocoanuts—All come from West Indies, Islands of Cuba, Jamaica, San Domingo and San Blas, Central America. They all land at East River piers, between No. 3 and No. 4. Amount, five million nuts in all.

VEGETABLES.

Potatoes—Southern States and New York State, but many come from Jersey and Maine. They arrive at Albany potato dock, Pier 41, North river, Pennsylvania Railroad, Old Dominion Steamship Company and Savannah Line, and Erie Yards, West Twenty-second street. Other roads, carrying small lots, at St. John's Park. Total, 1,688,065 barrels.

Onions—From same localities as above, and arrive at same places, 205,980 barrels and bags in all.

All other vegetables are enumerated below, and arrive at all railroad depots, Pennsylvania Railroad, Pier 29, North river, Savannah Line, Old Diminion Line:

	Barrels.		Barrels.
Sweet potatoes	29,000	Cucumbers and squash	125,000
Kale, spinach and lettuce	150,000	Beans, peas and tomatoes	900,000
Cabbage	600,000	Asparagus	70,000
Radishes, turnips and beets	81,000		
Citron	17,000		1,972,000

The amount of fruit and vegetables, etc., brought into the city during the year was as follows:

FOREIGN.

Bananas	3,546,419	bunches.
Oranges	867,717	barrels, boxes and crates.
Grape-fruit	9,000	" "
Lemons	2,260,000	" "
Almeria grapes	165,000	barrels.
Pineapples	14,574,300	loose.
Pomegranates	3,500	cases.
Onions (foreign)	47,000	bags and crates.
Figs and dates	1,200	cases.
Raisins	65,000	boxes.
Potatoes	30,000	bags.
Cocoanuts	5,000,000.	

DOMESTIC.

Apples	951,086	barrels.
Apples evaporated	164,845	cases.
Cranberries	99,578	cases and barrels.
Dried fruits other than evaporated apples	715,269	"
Watermelons	1,681,179	loose.
Muskmelons	8,000	barrels and crates.
California fruits	1,890,000	packages.
Grapes, trays and baskets	1,920,000	"
Potatoes	1,688,065	barrels.
Onions	205,980	"
All others as per report	1,972,000	"
Miscellaneous, berries, etc	4,000,000	crates.

The Inspection of Meat and Fish.

This work is performed as in the inspection of fruits and foods, two Inspectors being detailed for duty at the slaughter-houses and two at the wholesale markets and commission houses, etc. Reports are made weekly and in a similar way. The inspection has been carried on much as in former years, the force remaining the same. Great attention has been paid to the enforcement of section 32, Sanitary Code, and it is of rare occurrence to see meat exposed for sale outside of any store or market in the city. As can be seen, the seizures of meat and fish have been large, while the small stores and venders have been watched, yet the policy has been to seize any meat and fish that is unfit for food at the points where brought into the city, and before it is distributed to an infinite number of retail dealers, which would, of course, occur were this course not taken.

The sale of "bob veal," has been largely suppressed. The wording of the section of the Code being upon that point changed so as to define a "bob veal." This, and the hearty co-operation of the commission men, has materially assisted us to obtain these results, and it must be said that we not only have this hearty co-operation from the commission men in relation to "bob veal" but in every particular in relation to the prevention of the sale of unwholesome meat. Some cases have been found where carcasses of cows, which were affected with tuberculosis, were shipped to this market; the seizure in each case is followed by the notification of the State Board of Health of the name of shipper, his location, etc.

In general, the quality of the meat sold has been good; the work of the past years begins to show its effect, and while much meat and fish has been found unfit for food, yet few cases were detected where the same was knowingly offered for sale.

The amount of meat and poultry brought into the city and slaughtered is very large, the increase being some 20 per cent. over last year.

The amounts brought into the city were:

Poultry and Dressed Meat Received in New York City.

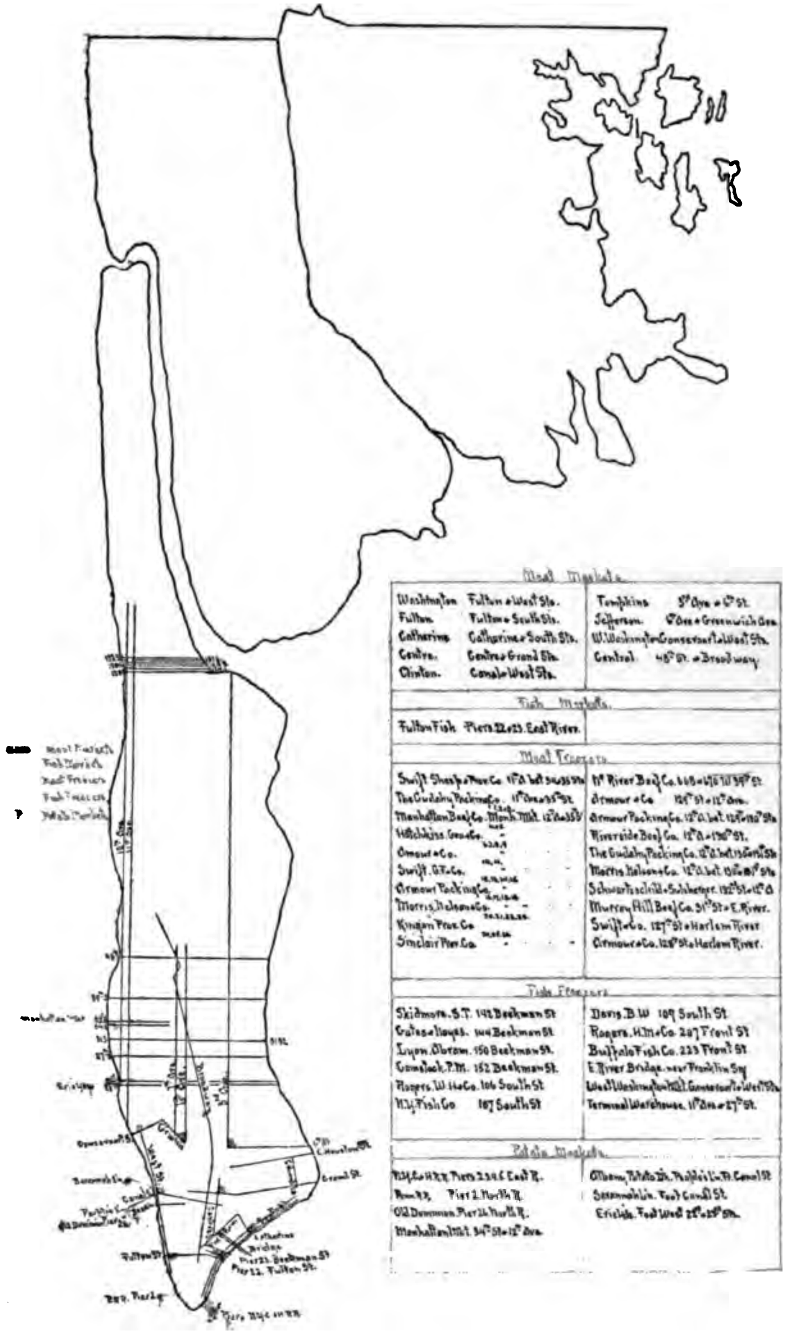
	Pounds.		Pounds.
Poultry, dressed	104,688,000	Dressed sheep	36,036,000
Poultry, live	26,595,000	Dressed beef	139,000,000
Dressed hogs	15,750,000		
Dressed calves	11,840,000	Total	333,909,000

Sheep, Hogs and Cattle Slaughtered in New York City.

DESCRIPTION.	NUMBER OF CARCASSES.	WEIGHT.
		Pounds.
Cattle	436,580	310,408,380
Sheep and lambs	1,476,534	75,303,230
Hogs	998,896	160,822,256
Total	2,912,000	546,533,866

Table Showing Amount of Fish and Shell Fish Received in New York City.

CHARACTER OF FISH.	WEIGHT.	SOURCE.
	Pounds.	
Fresh fish	50,000,000	Atlantic and Pacific Seaboards.
Shell fish	1,000,000	North and Mid-Atlantic Seaboards.
Salt and smoked fish	10,000,000	North Atlantic Seaboard and southwest coast of Ireland.
Average amount of fish in cold storage in city	1,500,000	
Total	62,500,000	



Meat Markets.	
Washington Fulton & West Sts. Fulton Fulton & South Sts. Catherine Catherine & South Sts. Centre. Centre & Grand Sts. Clinton. Canal & West Sts.	Tompkins 3rd Ave & 6th St. Jefferson. 6th Ave & Greenwich Ave. W. Washington Gansevoort & West Sts. Central. 45th St. & Broadway
Fish Markets.	
Fulton Fish Piers 22 & 23. East River.	
Meat Freezers.	
Swift Sheep & Prov. Co. 1st Av. bet. 34 & 35 Sts. The Cudahy Packing Co. 1st Ave & 35th St. Manhattan Beef Co. Manh. Mkt. 12th Ave & 35th St Hitchkiss Geo. & Co. " Armour & Co. " Swift, G.F. & Co. " Armour Packing Co. " Morris, Nelson & Co. " Kingan Prov. Co " Sinclair Prov. Co. "	N. River Beef Co. 668 & 676 W 39th St. Armour & Co 124th St. & 12th Ave. Armour Packing Co. 12th Av. bet. 129 & 130th Sts. Riverside Beef Co. 12th Av. & 130th St. The Cudahy Packing Co. 12th Av. bet. 130 & 131 Sts. Morris Nelson & Co. 12th Av. bet. 130 & 131 Sts. Schwartzschild & Sulzberger. 132nd St. & 12th Av. Murray Hill Beef Co. 31st St. & E. River. Swift & Co. 127th St. & Harlem River Armour & Co. 128th St. & Harlem River.
Fish Freezers.	
Skidmore, S.T. 142 Beekman St Gates & Hayes. 144 Beekman St Lyon, Ostrom. 150 Beekman St. Comstock, P.M. 152 Beekman St. Rogers, W. H. & Co. 106 South St N.Y. Fish Co 107 South St	Davis, B.W. 109 South St Rogers, H.M. & Co. 207 Front St Buffalo Fish Co. 223 Front St E. River Bridge. near Franklin Sq. West Washington Mkt. Gansevoort & West Sts. Terminal Warehouse. 11th Ave & 27th St.
Potato Markets.	
N.Y.C. & H.R.R. Piers 23 & 6 East R. Penn. R.R. Pier 2. North R. Old Dominion Pier 26 North R. Manhattan Mkt. 34th St. & 12th Ave.	[illegible] Potato Ex. [illegible] Ft. Canal St Seawanhaka. Foot Canal St. Erie Ldg. Foot West 23rd & 25th Sts.

OFFENSIVE TRADES.

By this term is meant the doing of anything by means of which is produced smoke, gases, the discharge of any finely divided material, odors, noises and vibrations, excessive temperatures, either low or high, and unusual or excessive, continuous or flashes of light, detrimental to life and health.

In this city the more prolific sources of nuisance, or at least those requiring greater attention in their supervision, are:

The slaughter-houses and allied industries.
The gas-houses, mains and holders.
The railroads, yards and depots.
The supplying of steam for heating and manufacturing.
The smoke-houses.
The elevated railroads.
and the use of bituminous coal or wood as fuel.

The map on page 204 shows their principal locations.

In offensive trades, the work during the past year has been more of a preventive character, from the fact that the work of previous years begins to have its salutary effect, for while many complaints, as can be seen by reference to the summary of this report, have been received, yet they have been of nuisances, generally, of a minor character.

The Standard Gas Company was the only one against which any large number of complaints was made; and this, too, has by means of wells sunk behind the bulkhead line, and new and larger separating tanks, prevented the discharge of drips upon the river and abated the nuisances.

The other gas-houses have not been such sources of nuisance as in former years, and but few complaints have been received.

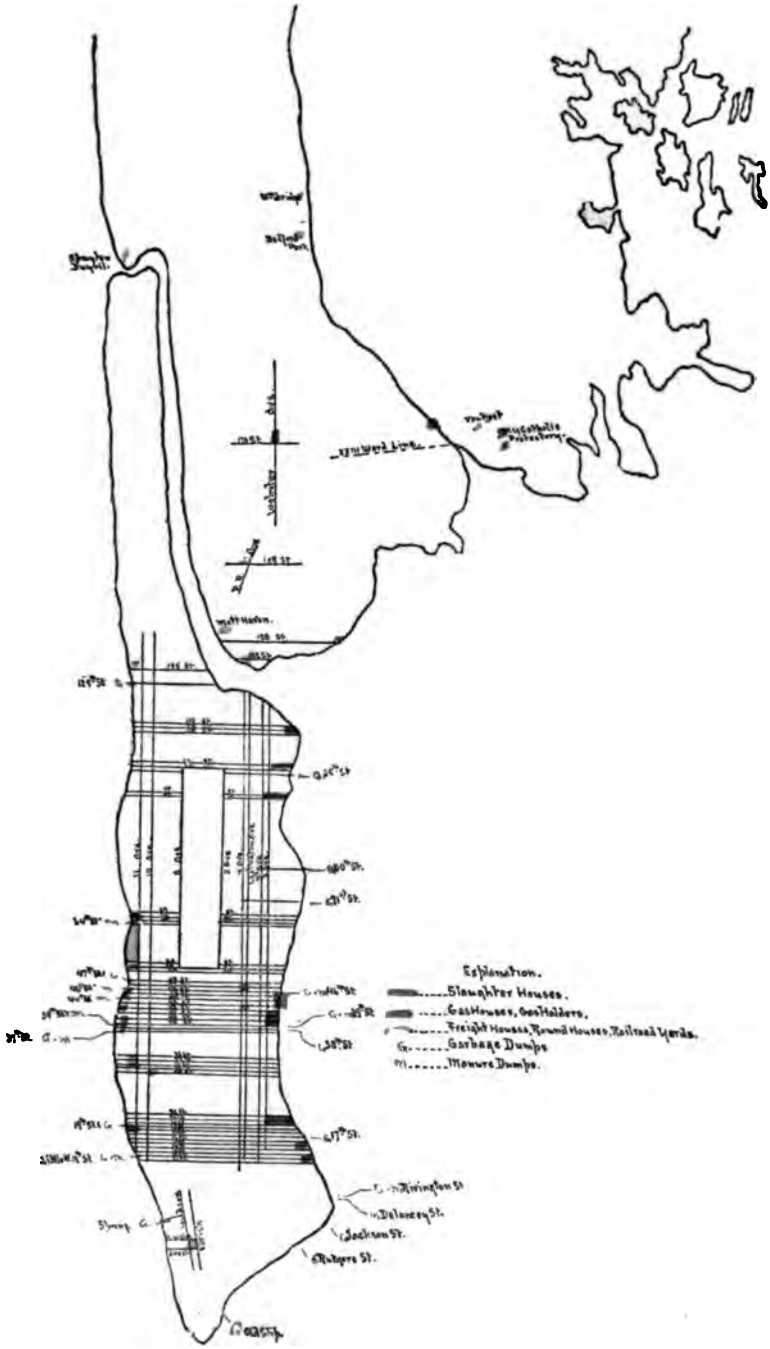
As before stated, the work of previous years, together with the almost daily inspections made, was the cause for this condition.

Many complaints were received as to the condition of the streets from the continual digging of trenches to lay gas-mains, etc., and have been treated in the usual manner by disinfecting with bromine, etc.

A new complaint was made this year to this effect: That the Croton water is impregnated with illuminating gas, and said gas was discharged in such quantities from the Croton tap as to cause an explosion.

This was so novel in character, and so intelligently investigated, as to merit record. The result was as follows:

Upon visiting the premises of complainant, the Inspector was informed that the explosion of gas was produced by gas escaping from a Croton water tap left open in a sink in the cellar. Upon opening the tap the odor of illuminating gas was still plainly perceptible. The complainant's store was at Fifty-first street and Sixth avenue. The point was, how could illuminating gas get into a water-main, the pressure being from within, outward. While making the inspection it occurred to the Inspector that the Pintsch Gas Company had a compressor in operation in the Fiftieth street power-house of the Broadway Railroad Company. Upon investigation at this place, it was found that a few hours before the


Mott Haven.
Catholic Protectory.
Ward Line
Explanation.
Slaughter Houses.
Gas Houses, Gas Holders.
Freight Houses, Round Houses, Railroad Yards.
G......Garbage Dumps
M......Manure Dumps.
80th St.
38th St.
17th St.
Rivington St
Delancey St.
Jackson St.
Rutgers St.

explosion in the cellar of the complainant that the pipe used to convey the compressed gas from pump to receiver had broken while in use.

This pipe was surrounded by a water jacket, connected with the Croton water supply and also with the sewer. When the explosion occurred, gas was forced into the water jacket, from thence into the Croton main and also into the sewer; the result was the gas passed into the water supply system of the neighborhood and caused the explosion. Since that time all such arrangements were changed, and the manager of the Pintsch Company informed me that he had telegraphed to all the stations of the company in the United States the facts, so that such an accident could not occur at other places.

From the chimneys of the New York Steam Heating Company, at their plant at Fifty-eighth street and Madison avenue, were being discharged vast quantities of cinders, which at times were carried by the wind many hundred feet in all directions, causing an intolerable nuisance. This was finally abated by causing the removal of the greater part of the plant to Sixtieth street and the East river, while the boiler which was allowed to remain at Fifty-eighth street (one perpendicular boiler) was equipped with a cinder arrester; this prevents any nuisance from that source. This boiler is to be used only in case of emergency or extremely cold weather.

The use of bituminous coal has increased during the past year, the following table showing the amounts used:

	MILLION TONS.	
	1895.	1896.
Bituminous coal	1¼	1¾
Anthracite coal	4¼	4½

And yet the nuisance from smoke has been less this year than during 1895. The gas companies have increased their output. The following table shows the average daily output and length of mains:

	OUTPUT.	MILES OF MAINS.		OUTPUT.	MILES OF MAINS.
	Cubic feet.			Cubic feet.	
Consolidated Gas Company	26,000,000	840			
Mutual Gas Company	2,500,000	130	New York and Northern Gas Company	4,000,000	38
Equitable Gas Company	4,800,000	153	Yonkers Gas Company	....	21
Standard Gas Company	2,500,000	162			
East River Gas Company	....	85	Total	40,800,000	1,494
Central Gas Company	1,000,000	65	Pintsch gas for cars, etc	100,000	.....

There have been many other sources of nuisances investigated, such as the Central Park ponds. The speed of the cable cars at Fourteenth street being another. In a report regarding this nuisance a recommendation was made that the speed could be reduced by a shorter cable, having less tension, thus allowing cable to slip without being pulled out, and obtaining its motive power from the cable now in use.

One of the more prolific sources of nuisance, viz., slaughter-houses, have been confined to certain localities and upon certain river fronts.

Method of Inspection.

The city is divided into two districts, Fourteenth street being the dividing line. One Inspector is assigned to each district. These Inspectors report on alternate mornings at 9 A. M. at Headquarters, except on Mondays, when they report at 9 A. M., handing in at the same time the weekly report of the work performed during the week previous.

The duties of these Inspectors consist principally in the investigation and report as to all complaints of nuisances, either from citizens or Departments, except as to nuisances from slaughter-houses, gas-houses and smoke-houses.

The complaints are attended to and all matters relating thereto are investigated by an Inspector and Sanitary Police Officer.

The entire force, however, are instructed to report at once all nuisances, without investigation, which they may observe ; so that while the Offensive Trade Inspectors are nominally four, yet in reality the entire force of forty (40) men are constantly on the watch for violations of every kind of offensive trades.

The Inspector detailed for gas and slaughter-house inspections make daily inspections of the slaughter-houses and of certain of the gas-houses near dwellings. The river front is carefully watched, and particularly at irregular intervals at night, in order to observe whether oils, tar, blood, etc., are being discharged into the waters.

The following being the general routine work of slaughter-houses and allied industries and gas-houses:

1st. Slaughter-houses and allied industries inspected daily to determine if—

(*a*) Blood and offal are allowed to pass into sewer.

(*b*) Slaughter-house is cleaned up as soon as day's or night's work is completed.

(*c*) That all material offensive, or liable to become so, is removed at this time.

(*d*) That the floors and pavements of cattle-yards, hog-yards, stock-yards are water-tight, etc.

(*e*) That the floors, walls, etc., of slaughter-houses are in good repair, etc., killing-beds and pens are water-tight, etc.

(*f*) That the rooms in which all operations producing offensive odors are produced, are so constructed that said odors are carried by off means of suitable fans and blowers, and after being scrubbed are either discharged below the surface of the river, together with a very large volume of cold water, or are caused to pass through the furnace, and through, *not over*, the glowing coals by which the gases are decomposed and thus deodorized.

All air admitted to such rooms is drawn in from the excess of in-draught in the exit pipe for gases and the in-draught is so arranged with suitable valves that any out-draught closes them.

(*g*) All of the pipes for conveying odors, the scrubbers and apparatus generally for deodorizing and disinfecting, are carefully examined each day.

2d. Gas-houses

That there are not—

Drips being discharged into river.

Purifying boxes open when the city is to leeward of them.

Beds of spent lime and iron being revivified and uncovered under same condition.

Holders which were uncupped.

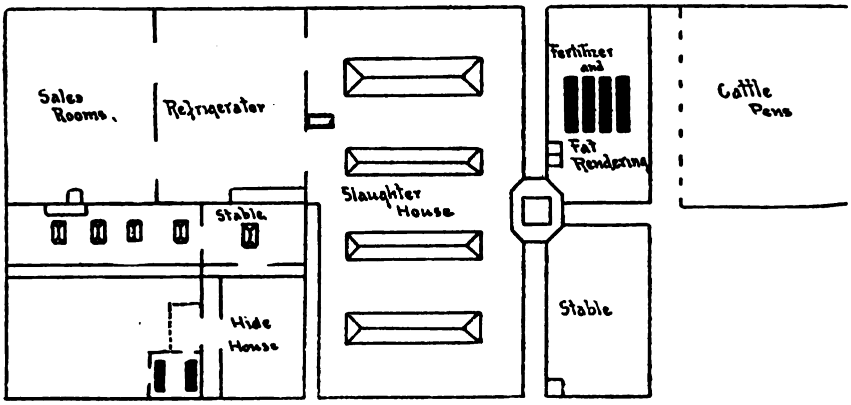
Oil on water in cups of holders.

An Inspector of Offensive Trades in this city must be a man of ability and experience, to successfully inspect and determine the cause; and while the official work is supposed to end here, the Department, pursuing the wise policy of ending its duties when the nuisance is pointed out and the order for abatement issued and enforced, yet it is a daily occurrence that the Inspector must know means to abate the nuisance in question in order to meet the case intelligently in the courts, should a trial result, or to *ex officio,* assist as far as he can, those who have caused a nuisance, and are, where the same is brought to their attention, willing to abate it; but can neither find any one to suggest a remedy nor discover it for themselves.

Upon his opinion as to cause and probable abatement of a nuisance, many large industries must often be placed where judgment or hasty conclusions might be the evident cause of the loss of much money, or the depriving of employment of many persons.

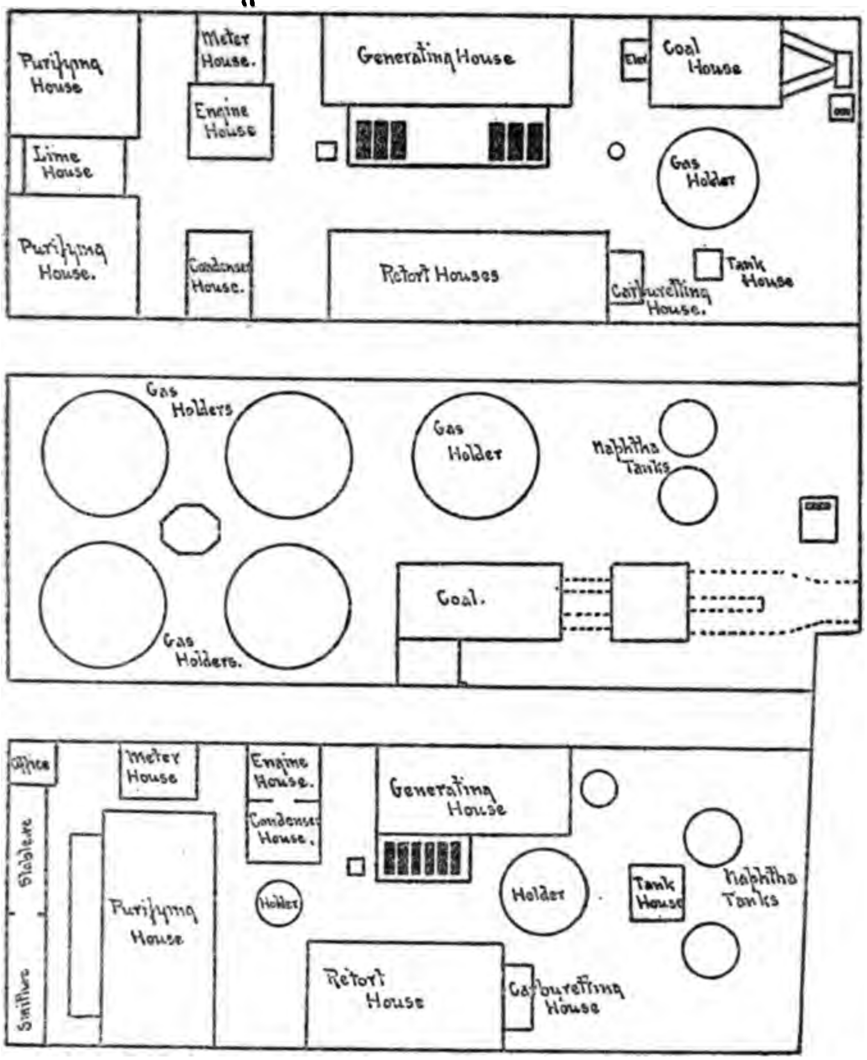
Suppose a factory employing 500 men were closed because a nuisance was caused by the operations carried on. The 500 men are not the only ones; each man can fairly be supposed to have a wife and children—1,500 more people. These 2,000 people indirectly support grocers, bakers, pay rent, etc. The result is far-reaching.

The following diagrams show the general plan of the slaughter-houses and gas-houses in the city inspected daily:



Typical Slaughter House

Typical Gas House



Summary of Work Performed by the Inspectors of Offensive Trades.

Inspectors on duty	2
Number of inspections	23,039
Number of citizens' complaints received	1,645
Number of original complaints by Inspectors	25
Number of citizens' complaints returned for orders	237
Number of citizens' complaints returned as negative	1,400
Number of days at Court or Department	725
Number of nights special work	102
Number of arrests	1
Number held on bail	1

In conclusion it can be stated that the work of the Division has been carried on very intelligently. The Inspectors have shown great zeal in the discharge of their duties, and have performed them in a business-like way. The results from the fact that every employee knows that, as long as he performs his duties in a proper manner, his position is just as assured to him as if he were in the employment of any large business house, and this is also the reason that the Department is able to keep in its employ professional men and others, even when larger salaries could be obtained by them in some other occupation.

The work, however, cannot be increased in future unless a larger number of Inspectors are employed, which in every one of the subdivisions mentioned is becoming more and more necessary every day.

EDWARD E. MARTIN,
Chief Inspector.

REPORT OF WORK PERFORMED BY THE INSPECTORS AND ASSISTANT CHEMISTS FOR THE YEAR 1896.

			Number.
Orders received	959	Citizens' complaints returned as negative	2,272
Complied with	714	Citizens' complaints under observation	33
Not complied with	290	Days at Court or Department	6,081
	Number.	Arrests	295
Inspections	404,809	Held on bail	279
Analyses	2,543	Trials at Special or General Sessions	355
Citizens' complaints received	2,668	Total amount of fines	$8,103 00
Citizens' complaints held over since last report	35	Total number pounds milk, fruit and foods, meat and fish, condemned and seized	7,526,569
Complaints made and returned to Sanitary Superintendent	705		
Original complaints by Inspectors	307		
Citizens' complaints returned for orders	398		

Milk Inspections.

	Number.		Number.
Inspections	63,499	Special day inspections	928
Specimens examined	68,488	Early morning inspections	587
Analyses of milk	1,513	Nights of special work	49
Citizens' complaints received	138	Quarts adulterated milk destroyed	183
Original complaints by Inspectors	2	Arrests	229
Citizens' complaints returned as negative	130	Held on bail	221
Citizens' complaints under observation	6	Trials at Special or General Sessions	257
Days at Court or Department	1,945	Amount of fines	$7,555 00

WORK OF ASSISTANT CHEMISTS.

	Number.		Number.
Analyses	2,095	Days at Court or Department	995
Experimental analyses	448	Nights of special work	11
Lactometers tested	32		
Thermometers tested	10		

Summary.

SUBSTANCE ANALYZED.	No.	SUBSTANCE ANALYZED.	No.	SUBSTANCE ANALYZED.	No.
Ammonia	1	Hair grower	2	Paste	1
Beef	1	Ice cream	2	Salve	1
Beer	6	Ice	4	Soda-water	4
Buttermilk	3	Icing	1	Sardines	5
Bread	1	Liquor	1	Sugar	1
Cake	1	Liquid	6	Silver polish	2
Chocolate	1	Meat	1	Syrup	6
Colors	4	Medicines (prescriptions)	9	Snuff	5
Cream	203	Milk	1,280	Sediment	2
Candy	105	" (condensed)	31	Sausage	2
Canned goods	4	" (preserved)	60	Toothpicks	1
Cherries	1	" (evaporated)	28	Varnish	1
Cider	2	Mineral water	17	Window-shades	1
Candles	2	Mushrooms	1	Water (Croton)	141
Coffee	1	Opium	5	" from wells	68
Cheese	3	Milk, sugar	2	" " tanks	3
Capsule	2	Port	1	" " cellars	26
Celery compound	1	Paste	2	" " springs	4
Experimental analyses	425	Poison, powder	4	Wines	7
Essence	5	Pastry	1	Water, river	8
Egg food	8	Peach	1	Whiskey	2
Fur boa	1	Popcorn	1	Whisk brooms	2
Garbage	1	Pretzel	1		
Ham	2	Rabbits' hair	1		

FRUIT AND FOOD INSPECTIONS.

	Number.
Inspections	187,436
Pounds of fruit and foods condensed	4,864,941
	Pounds.
Fruit condemned	4,216,267
Vegetables	607,285
Canned goods	31,739
Confectionery	1,265
Groceries	8,085
Drugs	300
Citizens' complaints received	640
Original complaints by Inspectors	247

	Number.
Citizens' complaints returned for orders	123
Citizens' complaints returned as negative	507
Citizens' complaints under observation	5
Days at Court or Department	632
Nights of special work	42
Arrests	44
Held on bail	40
Trials at Special or General Sessions	43
Amount of fines	$323 00

Summary.

ITEMS.	AMOUNT.	ITEMS.	AMOUNT.	ITEMS.	AMOUNT.
	Lbs.		Lbs.		Lbs.
Assorted fruits	50,245	Eggs	5,605	Potatoes	252,355
Apples	142,817	Figs	560	Pickles	150
Apricots	4,425	Greens	5,900	Plums	10,720
Asparagus	2,150	Grapes	35,910	Pears	53,680
Beans	125,800	Green corn	100	Prunes	550
Bananas	1,862,770	Green peas	11,350	Quinces	450
Blackberries	1,098	Groceries	320	Raspberries	710
Beets	4,700	Grape fruit	20,750	Sardines	16,575
Currants	1,070	Kale	7,840	Strawberries	5,500
Cucumbers	19,885	Leeks	8,000	Spinach	1,400
Canned goods	15,164	Lemons	288,830	Squash	8,300
Cauliflower	6,300	Lettuce	2,050	Sour sops	550
Cabbage	23,800	Limes	25,350	Sourkrout	400
Chestnuts	8,036	Melons (water)	501,225	Tomatoes	61,395
Cheese	1,610	" (musk)	54,700	Turnips	3,750
Cocoanuts	7,050	Mangoes	400	Vegetables, mixed	10,030
Cherries	1,780	Olives	50	INSPECTIONS.	
Cranberries	16,650	Oranges	517,695	Auction houses	721
Celery	11,050	Onions	4,800	Stores	40,766
Carrots	650	Parsley	360	Licensed venders	79,654
Candy	1,765	Peas	895	Vessels	738
Drugs	300	Peaches	63,315	Railroad depots	2,091
Garlic	27,000	Persimmons	300	Stands	61,422
Egg plant	7,425	Pineapples	539.081	Markets	10,040

MEAT AND FISH INSPECTIONS.

	Number.
Inspections	102,933
Pounds of meat and fish condemned	2,660,957
Citizens' complaints received	96
Citizens' complaints returned as negative	96
	Number.
Carcasses of beef condemned	500
Carcasses of veal condemned	3,993¾
Carcasses of sheep condemned	1,413
Carcasses of hogs condemned	2,709
Total	8,615¾
	Pounds.
Beef condemned	346,565
Veal condemned	247,857
Sheep condemned	115,661
Hogs condemned	348,043
Total	1,058,126
	Pounds.
Fish condemned	1,367,410
Assorted meats condemned	21,167

	Pounds.
Poultry condemned	200,544
Game condemned	13,710
	Number.
Days at Court or Department	647
Nights of special work	6
Arrests	21
Held on bail	17
Trials at Special or General Sessions	55
Amount of fines	$225
	Number.
Fish stores	4,112
Stands	7,408
Licensed venders	41,506
Commission houses	23,058
Butcher shops	4,450
Slaughter houses	9,956
Packing houses	335
Ice houses	7,868
Vessels	576
Railroad depots	520
Stock yards	2,023
Markets	1,121

INSPECTION OF COWS.

	Number.
Inspections of premises	906
Cows tagged	1,348
Temperatures taken	10,035
Cows examined (tuberculin test)	1,181
Cows examined (tuberculin test), negative	982
Cows found diseased	193
Cows condemned	191
Citizens' complaints received	3

	Number.
Citizens' complaints returned for orders	10
Citizens' complaints returned as negative	1
Citizens' complaints under observation	1
Days at Court or Department	165
Nights special work	1,004
Autopsies	192

INSPECTIONS OF MERCANTILE ESTABLISHMENTS.

	Number.
Inspections of premises	25,407
Inspections of basements	718
Inspections of water-closets	4,497
Inspections of lunch-rooms	381
Inspections of wash-rooms	1,743
Children examined	6,761
Certificates issued	5,781
Certificates denied	588
Citizens' complaints received	49

	Number.
Original complaints by Inspectors	32
Citizens' complaints returned for orders	12
Citizens' complaints returned as negative	37
Citizens' complaints under observation	3
Days at Court or Department	1,011

OFFENSIVE TRADE INSPECTIONS.

	Number.
Inspections	24,628
Citizens' complaints received	1,742
Original complaints by Inspectors	26
Citizens' complaints returned for orders	262
Citizens' complaints returned as negative	1,597

	Number.
Citizens' complaints under observation	18
Days at Court or Department	778
Nights of special work	115
Arrests	1
Held on bail	1

Summary.

	No.		No.		No.
	1,139	Fish markets	10	Restaurants	204
hops	69	Furniture factories	79	Rag shops	51
	103	Fertilizer factories	655	Round houses	13
ories.	23	Fat wagons	79	Railroads	22
	96	Gas engines	71	Railroads (elevated)	4
	339	Gas houses	631	Railroad depots	12
s	94	Gas leaks in mains	102	Slaughter houses (cattle)	6,466
s	6	Gas leaks in pipes	4	Slaughter houses (chickens).	4
	3	Gas leaks in houses	29	Smoke houses	200
factories	14	Gas holders	39	Saw mills	258
ufactories	29	Gas trenches	42	Soap manufactories	14
factories.	1	Grocery stores	42	Soda water manufactories	8
ctories.	78	Gut cleaning establishments.	75	Stores	574
ufactories	32	Gas on premises	1	Streets	85
factories.	18	Hair picking establishments.	41	Schools	22
ning establish-		Hide cellars	643	Spice and coffee mills	17
	15	Hog yards	128	Smelting works	14
ning establish-		Hat stores	6	Sausage manufactories	1
	23	Hospitals	21	Sewers	678
ks	4	Hotels	78	Silk mills	8
ops	9	Ice manufactories	18	Steam engines (stationary)	82
	2,192	Iron works	29	Stables	301
	4	Junk shops	1	Stone yards	20
warehouses	9	Kindling wood factories	61	Steam heating pipes	36
	66	Laundries	122	Steam exhaust pipes	293
	2	Lime kilns	64	Steam engines	5
re	36	Leather manufactories	5	Steam heating pipes	15
age)	29	Liquor stores	11	Tenement houses	2,364
	53	Locomotives	2	Tanneries	10
	7	Malt houses	1	Tobacco manufactories	2
	9	Machine shops	9	Tanks	1
	1	Milk depots	386	Vinegar factories	31
	2	Markets	5	Venders' wagons	10
	413	Music halls	9	Venders' stands	10
paratus manu-		Offices	1,651	Warehouses (malt and hops)	4
	1	Oil works	5	Water (Croton)	26
establishments	1,007	Packing houses	42	Water (wells)	11
	65	Private dwellings	965	Water tanks	12
	23	Printing houses	112	Water hydrants	23
	1,222	Provision houses	42	Wire works	33
	3	Piers	76	Wool pulling establishments.	2
	2	Public baths	6	Wheelwright shops	27
	38	Printing presses	6	Yards	94

Respectfully submitted,

EDWARD W. MARTIN,

Chemist.

DIVISION OF PATHOLOGY, BACTERIOLOGY AND DISINFECTION.

anitary Superintendent :

-I have the honor to submit the following report of the work
ed by the Division of Pathology, Bacteriology and Disinfection
ear ending December 31, 1896:

TABULATED STATEMENT.

rmed by the Assistant Di- r of the Diagnosis Labor- y—		Work performed by the Assistant Director of the Hospital Laboratory—	
of inspections	8	Number of inspections	139
of days on duty	277	Number of days on duty	223
of nights on duty	7	Number of nights on duty	1

Work performed by the Assistant Bacteriologists—

Number of days on duty	1,137
Number of nights on duty	10

Work performed by the Assistant Pathologist—

Number of inspections	1
Number of autopsies (human)	13
Number of autopsies (animal)	3
Number of days on duty	294

Work performed by the Assistant Chemist—

Number of chemical examinations	148
Number of days on duty	281
Number of nights on duty	6

Work performed by the Medical Inspectors—

Number of inspections, administration of diphtheria antitoxin	4,144
Number of inspections, tuberculosis	6,240
Number of inspections other than the above	1,892
Number of original complaints	513
Number of special reports	402
Number of cases treated with antitoxin	968
Number of curative injections of antitoxin given	1,410

Work performed by the Medical Inspectors—

Number of cases immunized with antitoxin	1,214
Number of days on duty	2,025
Number of nights on duty	250

Work performed by the Inspector in Charge of Vaccine Virus—

Number of animals vaccinated	160
Number of grammes of virus collected	311.82
Number of cubic centimeters of fluid vaccine virus prepared	1,439.5
Number of quill slips collected	40,908
Number of ivory points collected	17,575
Number of capillary tubes prepared	1,017
Number of clinical tests of vaccine virus made	82
Number of days on duty	287

Work performed by the Laboratory Assistants—

Number of visits to collect diphtheria culture tubes and samples of sputum	6,781
Number of days on duty	2,434
Number of nights on duty	95
Number of special visits to culture stations	593

Summary.

Number of inspections, administration of diphtheria antitoxin	4,144
Number of inspections, tuberculosis	6,240
Number of inspections other than above	1,892
Number of autopsies (human)	13
Number of autopsies (animal)	3
Number of original complaints by Inspectors	513
Number of special reports	402
Number of cases treated with diphtheria antitoxin	968
Number of curative injections of diphtheria antitoxin given	1.410
Number of cases immunized with diphtheria antitoxin	1,214
Number of bacteriological examinations, general	2,532
Number of samples of vaccine virus tested bacteriologically	84
Number of samples of other substances tested bacteriologically	75
Number of bacteriological diagnoses of cases of suspected diphtheria	10,293
Number of cases found to be true diphtheria	6,211
Number of cases found to be pseudo-diphtheria	2,239
Number of cases exact bacteriological diagnosis impossible	1,843
Number of bacteriological examinations of healthy throats in infected families	1,643
Number of secondary bacteriological examinations of diphtheria (convalescents)	13,113
Number of bacteriological examinations of supposed tuberculous sputum	1,856
Tubercle bacilli found	901
Tubercle bacilli not found	950
Suspicious bacilli only, found	5
Number of injections of animals with toxins	628
Number of animals bled for antitoxic serums	124
Number of samples of toxins tested	296
Number of samples of antitoxic serums tested	446
Amount of diphtheria antitoxic serum produced, in cubic centimeters	116,835
Amount of tetanus antitoxic serum produced, in cubic centimeters	3,020
Amount of tuberculin produced, in cubic centimeters	728
Number of chemical examinations	148
Number of animals vaccinated	160
Number of grammes of vaccine virus collected	311.82
Number of cubic centimeters of fluid vaccine virus prepared	1,439.5
Number of quill slips collected	40,908
Number of ivory points collected	17,575
Number of capillary tubes prepared	1,017

Number of clinical tests of vaccine virus made	82	Number of examinations of blood from other diseases	6
Number of samples of blood examined for typhoid reaction	291	Number of visits to collect diphtheria culture tubes, etc.	6,781
Showing positive reaction	126	Number of special visits to culture stations	593
Showing negative reaction	105		
Showing doubtful reaction	60		

The more important branches of routine and research work carried on by this Division during the past year are considered in detail in the annexed reports, prepared under my direction by Mr. Alfred L. Beebe, Assistant Director of the Diagnosis Bacteriological Laboratory, Dr. William H. Park, Assistant Director of the Hospital Bacteriological Laboratory, Dr. John H. Huddleston, Medical Inspector in charge of the Vaccine Laboratory, and Dr. Arthur R. Guerard, Assistant Bacteriologist. In Mr. Beebe's report is included an account of the methods employed and results obtained in the examination of samples of sputum for tubercle bacilli and other pathogenic bacteria, prepared by Dr. Charles B. Fitzpatrick, Assistant Bacteriologist, in whose immediate charge this branch of the work has been placed during the year. The maps accompanying Dr. Guerard's report were drawn by Mr. Halsey Durand, of the Division of Food Inspection, Offensive Trades and Mercantile Establishments, whose services were given through the kind permission of Mr. Edward W. Martin, Chief Inspector of the Division.

The year has been marked by rapid expansion along the lines of work previously established, and by successful entrance into several new fields of labor. The demands thus made upon the laboratory and executive staff of the Division have been heavy, and it is gratifying to record the willingness with which these demands have been met by all concerned. An increase in the working force was made during the latter part of the year by the appointment of six Assistant Bacteriologists, and two additional Laboratory Attendants.

The development of routine work in the bacteriological examination of cultures and specimens of sputum in suspected cases of diphtheria and pulmonary tuberculosis, respectively, has been very marked. This is specially noticeable in the matter of specimens of sputum, the number of these received from physicians for examination during the past year being over sixty per cent. in excess of that received during 1895. A similar increase has occurred in the number of private cases of tuberculosis reported to this Department by physicians, and of cases reported by public institutions throughout the city. The inspection of apartments in tenement-houses, vacated by consumptives through death or removal to a hospital, and their enforced renovation if necessary, has been vigorously and successfully carried on throughout the year. In connection with these inspections, a study of the records of cases and deaths, kept for the past three years by this Division, and more especially of the map of the city upon which these cases and deaths have been plotted, has been made, to determine what evidence was presented as to the communicable character of this disease. The interesting and valuable results of this investigation are given in Dr. Guerard's report, alluded to above. They furnish significant testimony as to the infectious nature of pulmonary tuberculosis. An important step toward the prevention of the spread of infection in this and in other infectious diseases of the respiratory tract was taken by the Board during the past year, through the addition to the Sanitary Code of a section forbidding expectoration in public places, and requiring the posting of notices to this effect in surface and elevated cars, etc. This action was based upon a joint report submitted to the Board by Dr. T. Mitchell Prudden, Consulting Bacteriologist, and the undersigned. This report is inserted in full later.

In connection with the routine work in the bacteriological diagnosis of diphtheria, an investigation has been made with regard to the virulence of morphologically typical diphtheria bacilli found in the throats of individuals believed by the attending physician to be suffering only from some form of simple acute inflammation of the upper respiratory tract. In the great majority of these cases, the bacilli were found to be fully virulent, and the cases therefore as truly diphtheria, from a sanitary standpoint, as those in which the clinical symptoms of the disease are well marked. The details of this investigation will be found in Dr. Park's report, and in an article by the undersigned, which latter is reprinted in an apppendix to this report.

The use of antitoxic serum for the treatment and prevention of diphtheria, both by the Medical Inspectors of this Division and by physicians throughout the city, has exhibited a most remarkable increase, especially during the latter months of the past year. The results have been in the highest degree satisfactory, as shown not only by the reports made to this Department by the Inspectors and by physicians in a large number of cases, but also by a large decrease in the death rate and absolute mortality in this city from diphtheria, as compared with previous years. Contributory in no small degree to this gratifying result has been the improvement made during the year in the strength and quality of the diphtheria antitoxin produced and distributed by this Department. This improvement is the direct result of extended and successful experimentation regarding the rapid production of strong toxin and its use for immunizing the horses employed in producing antitoxin. In line with the above, investigations have been carried on for some months, and are now in progress, looking toward the preparation of antitoxin in a dried form.

Tetanus antitoxin, mallein and tuberculin have, during the year, been added to the laboratory products of this Department, and their distribution and use is slowly increasing.

The diagnosis of rabies in suspected animals, and the preparation of attenuated virus for the prophylactic treatment of the disease, is another line of work for which provision has been made during the past year. In preparation for this Dr. Anna W. Williams, one of the Assistant Bacteriologists attached to this Division, received special training at the Pasteur Institute in Paris.

An investigation of the value of Widal's test, as an aid in the diagnosis of cases of suspected typhoid fever, was begun late in the year, and is still in progress. Preliminary experiments having met with very fair success, it was decided to offer to physicians throughout the city opportunities to submit specimens of dried blood for examination in cases of suspected typhoid. To this end a descriptive circular was prepared and issued, and slides for the preparation of specimens, with directions, and blanks for furnishing the necessary clinical data, were placed at the disposal of physicians, through the depots of the Department established throughout the city for the distribution of supplies and the collection of specimens from cases of diphtheria and tuberculosis. A very considerable number of specimens has thus been received and examined. It is as yet too early to allow of a definite statement as to the exact value of this test ; but the results so far obtained are certainly encouraging.

The production of serums available for the prevention and treatment of typhoid fever, pneumonia and the infections due to the streptoccus and bacterium coli communis, or for aid in the differentiation of allied bacteria, has engaged the attention of several of the laboratory workers. While entire success has not attended the efforts made in these directions, promising results have been obtained in several instances, and a practical solution of some of the problems presented may be anticipated.

Special reference should be made to the successful outcome of the experimental work begun in 1895, and continued during the past year, having for its object the improvement of the vaccine virus produced by this Department. This has included a study of the methods employed in the best vaccine laboratories of this country and of Europe, has involved minute investigations into every phase of the subject, and has resulted in a complete change of the methods of production formerly in use. The use of serum dried on ivory points or quills has been abandoned, and the virus is now issued in the form of a glycerinated vaccine pulp, which preserves its high potency undiminished for months, and none of which is distributed for use until subjected to rigid bacteriological and clinical test.

The details of the work of the Division for the past year, of which the above is a summary, will be found, as previously stated, in the subjoined reports, and in certain articles prepared under my supervision and published during the year by members of the staff, which are here reprinted for reference and preservation in permanent form.

Respectfully submitted,

HERMANN M. BIGGS,

Pathologist and Director of the Bacteriological Laboratories.

REPORT FROM THE DIAGNOSIS BACTERIOLOGICAL LABORATORY.

To the Pathologist and Director of the Bacteriological Laboratories :

SIR—I have the honor to submit the following report, with special relation to the executive and routine diagnosis work of this Division for the year 1896, embracing bacteriological diagnoses in cases of suspected diphtheria, administration of diphtheria antitoxic serum for the cure and prevention of diphtheria, and the sanitary supervision of tuberculosis. There is also included a report by Dr. Charles B. Fitzpatrick, Assistant Bacteriolgist, regarding the methods employed and results obtained in the diagnosis laboratory of this Division in the examination of samples of sputum for the bacillus tuberculosis, and for other pathogenic bacteria, with certain investigations on related subjects. This branch of the work has been under the direct charge of Dr. Fitzpatrick during the year.

Bacteriological Diagnosis of Diphtheria.

The remarkable increase in this branch of the work of the Division, since its inauguration in May, 1893, is well shown in the following summary :

	1893 (From May 6).	1894.	1895.	1896.
Total cultures examined ; daily average	14.6	36.1	63.0	69.6
Cultures made for diagnosis (primary) ; total examined	2,775	7,609	9,526	10,293
Cultures made after convalescence (later) ; total examined	1,332	5,637	10,988	13,113
Cultures made from healthy throats in infected families (trial) ; total examined	......	......	2,344	1,643

This increase indicates a most gratifying growth of confidence on the part of the medical profession in the value of bacteriological examinations as an aid to clinical diagnosis in cases of suspected diphtheria, and affords ample justification for the time, labor and money expended in the inauguration and development of the work. The system is now very generally adopted by sanitary authorities in this country and abroad, and is universally recognized as a proper and necessary branch of sanitary work. Its great extension in this city has involved the careful systematization of the work of collection and examination of cultures, and the reporting and recording of results, and in view of this it is deemed that a somewhat detailed account of the methods now employed in these respects will, perhaps, prove of interest, and certainly of value, as a matter of record. Such an account follows :

"Culture outfits," consisting of a tube of Loeffler's blood serum mixture, another containing a sterilized cotton swab on the end of a stout steel wire. and a blank for use in furnishing the necessary data regarding the case, all inclosed in a suitable receptacle, can be obtained by physicians or by the Medical Inspectors of the Department, free of charge, at some seventy-five drug stores throughout the city. These stations also supply receptacles for the collection of samples of sputum, and slides for the preparation of blood specimens in cases of suspected typhoid fever, with the necessary blanks, directions for making cultures, collecting sputum, etc., and lists of all stations where outfits can be obtained. Specimens can be left for collection at any of these stations, or can be brought directly to the Department at any time, day or night, the office of the Division of Contagious Diseases being always open. Some twenty of the stations are visited daily, Sundays and holidays included, by employees of this Division, for the purpose of collecting cultures or other specimens left by physicians or Department Inspectors, and of furnishing any needed supplies. Arrangements are made with the remaining stations to forward cultures, etc., received during the day, either to some one of the stations visited daily, at an hour just previous to that of the collector's arrival, or else directly to the Diagnosis Laboratory. The endeavor is thus made to ensure the collection of cultures from any of the stations at as late an hour as is consistent with their reaching the laboratory on the evening of the same day. On the revised list of stations shortly to be issued for general distribution, this hour will be approximately indicated for each of the stations. In general, it may be said that cultures, etc., left by physicians or inspectors at any of the stations before 3.30 P. M. on week days, and before 2.45 P. M. on Sundays and holidays, reach the laboratory on the evening of the same day. Stations not visited daily are required to notify the Department whenever their supply of culture tubes, etc., runs low. This is then promptly replenished, usually through one of the stations visited daily.

Written agreements are entered into with all the stations regarding the care of supplies and the transmission of cultures or other specimens, at certain hours and in certain ways, and strict conformity with these agreements is required. From time to time, the stations (especially those not visited daily) are inspected by a qualified employee in order that any errors or misunderstandings of their duties as agents of the Department may be rectified.

The cultures brought in by the collectors reach the laboratory between 5.30 and 6.30 P. M. The tubes and accompanying blanks are at once marked for identification (cultures made for diagnosis—primary—by numbers; cultures made after convalescence—later—by letters) and are placed in the incubator not later than 7 P. M. At 8 A. M. the following day (as early an hour as is consistent with at least thirteen hours incubation) they are removed by laboratory attendants (especially trained to the work), arranged in racks and prepared for microscopic examination. In the meantime the accompanying blanks are compared by a clerk with the records, in order that any errors made in filling them out may be corrected, are stamped with the date and returned to the laboratory. The microscopic preparations are made on cover glasses in the usual way, Loeffler's alkaline methylene blue being employed as a stain and care being taken to secure an average of the bacterial growth from each culture. They are mounted in Canada balsam, three on a slide, and numbered or lettered in correspondence with the mark on the culture tube and accompanying blank. Duplicate preparations are made by another attendant from certain cultures selected at random, in order to detect any error which might occur in the preparation of so large a number of specimens as is usually handled daily. At 9 A. M., with the blanks accompanying the cultures before them, microscopic examination is commenced by at least two of the bacteriologists of the Division. One of these bacteriologists examines all the primary and trial cultures, reserving those in which typical diphtheria bacilli are at once apparent, and turning over to his comrade, for longer and more minute examination, all preparations apparently showing no diphtheria bacilli, or in which the bacilli found are not absolutely typical. "False" and "doubtful" cultures thus receive a double examination, and the chances of error are thereby minimized. The examination of the "later" cultures is divided between the two bacteriologists. Results of examination are in all cases recorded on the blank accompanying the culture, and initialed by the observer. The blanks are then handed to the clerk, who enters upon them a record number and makes out duplicate reports on the proper forms, one to the attending physician, the other to the Medical Inspector of the district in which the case is located. The observer then personally compares the report, made to the attending physician of the result of examination of each primary and trial culture, with the original blank, and signs his name to the report as examiner. Results of primary cultures are mailed to the attending physician not later than 1 P. M. on the day of examination. Results of later cultures are made out and mailed to the attending physician and District Inspector during the afternoon of the day of examination, with the exception of Sundays and holidays, when they are not forwarded until the following day. A "culture list" is also prepared, giving result of all primary and trial cultures, with name and address of patient. This is forwarded each day to the Division of Contagious Diseases. No report is allowed to be issued until it has received careful and independent comparison with the original record.

It will be observed that in the reporting of results, every precaution is taken to minimize the chance of error, and to fix the individual responsibility for any mistake made.

The collection and examination of cultures is carried on daily, Sundays and holidays included. On the latter days, a special detail of one collector, clerk, laboratory attendant and assistant bacteriologist is made for this work.

It remains to describe the system of filing and indexing the results of examinations. Results of examinations of primary cultures, subdivided according to positive, negative and indecisive results, are entered daily in a journal, under record number and address of patient. The actual number only of later and trial cultures, received respectively on any given day, is also entered. With indecisive cultures, the reason for failure to allow of a definite report is indicated, as is also the request for a confirmatory culture, should this be made, and the receipt of such culture, should one be forwarded. The blanks accompanying cultures, which are, of course, original records, not only of clinical data, name and address of patient, etc., but also of results of bacteriological examination, are placed in suitable envelopes, made to fit the blanks and bearing certain data to which frequent reference is necessary. These are: Name and address of patient; date when culture was made (or case reported); result of culture (positive, negative, indecisive); date of death, should this occur, and result and date of later cultures. All of the blanks accompanying cultures in any given case are filed in the same envelope, together with any letters or other communications relating thereto, and these envelopes are then arranged in a suitable filing case, according to street and house number. The street index thus formed is compared daily with the list of cases of and deaths from diphtheria received by the Division of Contagious Diseases. Should no cultures have been received in any given case or death, the proper entries are made on an envelope and this is inserted in the index. If a culture is subsequently received from a reported case, the accompanying blank is filed in the envelope already in the index. By this system duplication is avoided, and at the same time a record of all cases of diphtheria reported to the Department is secured, arranged for quick and convenient reference.

In addition to the above, all cases of diphtheria and deaths from the same, after elimination of those cases proven not to be diphtheria by bacteriological examination, are entered, by means of appropriate symbols indicating the month and year, on a map of the city drawn to so large a scale as to show every house lot thereon.

From the inception of the work of bacteriological diagnosis in cases of suspected diphtheria, it has been the constant aim of the Department to make the service of as great usefulness to physicians as possible. To report the result of the examination of a culture as positive, negative or indecisive, simply, is a comparatively easy matter, involving but little exercise of mental activity on the part of the examiner, and in many cases adding but little to the knowledge of the physician who receives such a report, or to that of the Medical Inspector, whose action is necessarily governed, to a considerable degree, by the character of the report received. To be of the greatest assistance, it has always been believed that the report made in any given case should be conditioned not alone upon the result of the microscopic examination; but upon this taken in connection with the clinical data (age, day of disease, location of membrane, etc.) furnished on the blank accompanying the culture. This is a far more difficult matter. It involves the exercise of judgment based upon experience, necessarily increases the chances of error and requires the observer to have received a much more extended and severe training than is needed to insure accuracy solely in the recognition of the diphtheria bacillus. The approbation generally accorded by the medical profession to the present system, which has from the first been consistently followed by this Department, affords, it would seem, the best justification for its inauguration and continuance and the best proof of its usefulness.

Administration of Diphtheria Antitoxin.

The administration of antitoxic serum for the treatment and prevention of diphtheria has been carried on throughout the year with marked success by the Medical Inspectors assigned to this duty, 968 cases having been treated and 1,214 individuals immunized against the disease. A continuous and marked improvement has been noted in the results obtained, in consequence, it is believed, of increased experience in the use of the serum, opportunity for its administration earlier in the disease through the increasing belief of physicians in its efficacy, and the more prompt reference of cases in consequence, the stronger serum now at command, and the larger dosage employed. The use of antitoxin by the medical profession in this city has increased greatly during the year, and the reports received from a number of physicians of the results of treatment are most favorable. Some eighty-seven drug stores throughout the city now act as agents for the sale and free distribution of antitoxin, and it has been found necessary to specially detail an employee of this Division to supervise the stock of these establishments, in order that it may be kept in good condition and ample for all demands.

Reports of the results of antitoxin treatment received from the Inspectors of this Division, and from a number of physicians who have obtained the remedy free of charge for use among the poor, have been tabulated to October 1, 1896, with the following general results:

Treated by Inspectors.

	CASES.	DIED.	MORTALITY, PER CENT.
January 1, 1895, to April 1, 1896	856	154	17.9
April 1, 1896, to October 1, 1896	395	44	11.1
Total	1,252	198	15.8

Treated by Physicians.

	CASES.	DIED.	MORTALITY, PER CENT.
October 1, 1895, to April 1, 1896	86	15	17.2
April 1, 1896, to October 1, 1896	289	53	18.3
Total	365	68	18.1

The large increase in the use of antitoxin by physicians, and the great improvement in results obtained by the Inspectors during the more recent periods covered by the above tabulation, are specially noticeable. For further details, reference is made to an article on "The use of Antitoxic Serum in the Treatment of Diphtheria under the Supervision of the New York City Health Department," by Drs. Biggs and Guerard, which appeared in the "Medical News" of December 12, 19 and 26, 1896, and which also furnishes a resumé of the published reports on the subject. This report is reprinted below. The evidence therein presented of the efficacy of diphtheria antitoxin is overwhelming, and affords satisfactory proof that the mortality in this disease has been reduced by at least 50 per cent. in every country where the remedy has been generally employed. In view of these facts, the position of this Department, as a pioneer among sanitary authorities in the production and use of diphtheria antitoxin, is specially gratifying.

Sanitary Supervision of Tuberculosis, and Bacteriological Examination of Sputum.

The work of the Division in this respect has exhibited during the year an increase corresponding to that shown in the bacteriological diagnosis of diphtheria, and the administration and distribution of diphtheria antitoxin. This increase has been specially marked in the number of cases of tuberculosis reported and of specimens of sputum received for examination, and in these respects is the best proof of the approbation increasingly given by the physicians of this city to this branch of the work of the Department. The following table more fully exhibits this increase :

	1894. FROM MARCH 2.	1895.	1896.
Specimens of sputum received and examined :			
Daily average	1.7	3.1	5.1
Total	511	1,147	1,856
Cases of tuberculosis reported :			
By physicians	278	514	985
By public institutions	3,985	5,310	7,349

The daily handling of so considerable a number of sputum specimens, many of them loaded with tubercle bacilli, involves a decided addition to the risk of possible infection among the laboratory workers, already incurred through the receipt and examination of the large number of diphtheria cultures which now reach the laboratory. The following rules for the care of infectious material were, therefore, formulated, with the approval of the President of the Department and the Commissioner of Health, and are posted in the laboratory. They are as follows:

"The following rules for the prevention of possible infection in the bacteriological laboratories of this Department must be strictly obeyed. The Assistant Directors in immediate charge of said laboratories will enforce the same:

"First—After handling tubes, bottles, etc., containing diphtheria cultures, samples of sputum or any other possible infectious material, or any culture made from the same, the hands must be thoroughly washed with soap and water, using a nail brush, and must then be rinsed in a solution of bicloride of mercury, 1 to 1,000. This must be done immediately after handling such material, and before proceeding to other work.

"Second—The hands must be washed and rinsed as above when leaving the laboratory at the lunch hour, or at the conclusion of the day's work.

"Third—Desks must be thoroughly wiped off at least once daily with a solution of carbolic acid, 5 per cent. Floors must be mopped with the same solution at least once weekly.

"Fourth—Samples of sputum, diphtheria culture tubes and all other possible infectious material, together with all cultures made from the same, must be sterilized as soon as work on them is concluded.

"Fifth—The blanks accompanying samples of sputum must be sterilized immediately after unwrapping samples.

"Sixth—Vials, receptacles, corks, wrappers and everything accompanying samples of infectious material must be sterilized as soon as possible."

In addition to the above, more specific rules have been formulated and posted, regarding the precautions to be taken in handling specimens of sputum. These are as follows:

Directions for Handling Samples of Sputum.

First—Receipt of samples:

(*a*) Remove outer wrappings and burn them at once.

(*b*) Place samples, with blanks, in metallic box and cover with layer of cotton, moistened with 5 per cent. carbolic acid solution.

(*c*) Wash the hands with soap, etc.

Second—Preparation of specimens for examination:

(*a*) Mark blanks and specimens for identification.

(*b*) Sterilize blanks.

(*c*) Wash the hands with soap, etc.

(*d*) Make smears, put away specimens, wipe desk with 5 per cent. carbolic acid solution.

(*e*) Wash the hands with soap, etc.

(*f*) Stain smears and mount.

(*g*) Wash the hands with soap, etc.

Strict obedience to all of the above rules is required from every laboratory worker.

Dr. Fitzpatrick's report, regarding the bacteriological diagnosis of pulmonary tuberculosis, follows:

The principal object of this work has been to ascertain to what extent the examinations of sputum in cases of pulmonary infections, both tubercular and non-tubercular, can be reduced to simple and practical methods for use in a municipal bacteriological laboratory, and the sanitary and medical value of such examinations. Some experimental work on related subjects has also been attempted. The report of the work is divided as follows:

1. The routine examination of sputum for the bacillus tuberculosis.
2. Examinations for pathogenic bacteria other than the bacillus tuberculosis in pulmonary tuberculosis and in non-tubercular pulmonary diseases.
3. Some observations on the infectiousness of sputum and its disinfection.
4. Bovine tuberculosis.

1st. The Routine Examination of Sputum for the Bacillus Tuberculosis.

The specimens of sputum from cases of suspected tuberculosis examined during the year were 856 in number. In these, the presence of the bacillus tuberculosis was demonstrated in 901 ; no cilli of tuberculosis were found in 950, and suspicious bacilli were found in 5. In 173 cases in hich the bacillus tuberculosis was found, the clinical diagnosis, as given on the blank accompany- g the sample, was stated to be other than pulmonary tuberculosis. These diagnoses were as llows : Bronchitis in 98 cases ; pneumonia in 20 cases ; pleurisy in 19 cases ; chronic broncho- neumonia in 7 cases ; catarrh in 6 cases ; laryngitis in 5 cases ; anæmia in 5 cases ; asthma in cases ; catarrhal pneumonia in 4 cases ; cold in two cases, and grippe, pertussis and Bright's isease in 1 case each. .Of the cases examined from July 8 to December 31, 1896, and which howed the presence of the bacillus tuberculosis, 124 had no fever.

Staining Methods—The specimens were stained by the B. Fraenckel method, at the time of y being assigned to this work. This method employs a solution of carbolic acid fuchsin for the rimary stain. A water and alcohol solution of methylene blue, containing 20 per cent. of nitric cid, is then used for the double purpose of partially decoloring the primary stain and making a lue contrast stain.

This method is a very practical and rapid means of staining specimens of sputum. Many reparations, however, have been found to contain forms of foreign matter stained so as to some- hat resemble the bacilli tuberculosis. Partially stained bacilli tuberculosis are also frequently bserved, and bacilli occur which have a dark or purple tint, with traces of light blue. In short, is often very difficult, by this method, to make preparations in which the primary stain is horoughly decolorized, and in which a good contrast is obtained.

The specimens received for examination frequently contain a considerable quantity of foreign atter—dust, particles of food and substances originally contained in the receptacle. This makes imperative that these particles of foreign matter should be differentiated as completely as possible.

The occurrence of partially stained bacilli—bacilli which appear to be intermediate forms etween the red or pink bacilli tuberculosis and the blue bacteria stained by the constant stain— enders a diagnosis very difficult. If a given number of preparations—for example, three prepara- ions of a given specimen of sputum—had been thoroughly examined and no bacilli found, it often appened that the fourth preparation from the same specimen of sputum would show a partially tained bacillus, so closely resembling a bacillus tuberculosis as to render a positive diagnosis mpossible. Such experiences not only consume much time, but are also extremely discouraging.

Another drawback to this method is that 20 per cent. solutions of nitric acid often decolorize he bacillus tuberculosis. These bacilli thus decolorized are stained blue by the contrast stain. The resistance of the bacillus tuberculosis to the process of decolorization by means of 20 per cent. olutions of nitric acid, or similar strong acid solutions, is not constant. Some bacilli tuberculosis decolorize and some do not. With the 20 per cent. solution of nitric acid I have succeeded in decolorizing some specimens of the bacillus tuberculosis within one or two minutes. Other speci- mens have resisted decolorization for ten, fifteen or twenty minutes, and one was not decolorized after remaining for thirty minutes in the solution. A decolorizing solution which gives such varying results should not, in my judgment, be used.

My experience indicated the necessity of dividing the steps of the process, and the following as finally been elaborated as a reliable and satisfactory method :

(*a*) Make the smear as usual, and after it has been dried and passed through the flame :

(*b*) Place, with the smeared surface downward, upon the surface of a watch glass full of a watery solution of freshly-prepared Ehrlich's anilin-fuchsin. The watch glass is then raised by means of a forceps and held over a small flame until the solution, as a whole, begins to bubble. It is then removed from over the flame and allowed to stand for one minute ; then—

(*c*) Remove the smear and wash it off in water, turning the smeared surface upward.

(*d*) Place the smear in 5 per cent. hydrochloric acid 70 per cent. alcohol (*i.e.*, 5 parts of hydrochloric acid plus 95 parts of 70 per cent. alcohol) and allow the smear to remain in this solu- tion for one minute, during which time it should be moved gently from side to side ; then—

(*e*) Wash the acid off thoroughly in water and put on a watery solution of methylene blue in alcohol and water. In this laboratory Loeffler's solution of methylene blue is used. The solution is allowed to remain on the smear one or two minutes ; then—

(*f*) Wash off the methylene blue solution, dry the smear and pass it rapidly through the flame ten or twelve times.

(*g*) Mount in xylol-balsam.

Ehrlich's anilin-water-fuchsin solution is prepared as follows : Mix 4 ccm. of anilin oil with 100 ccm. of water by shaking thoroughly. Filter this solution through a wet filter ; add 11 ccm. of a concentrated alcoholic solution of fuchsin to the filtrate and shake thoroughly. The Ehrlich solution should be made fresh every third day to obtain a stain of the maximum intensity. After about the third day it gradually begins to lose its power to stain an intense red. By the fourteenth day the solution has become unreliable, and is, generally, when two weeks or more old, unfit to be used.

The advantages of this method are that it gives a distinct and characteristic pink or red to the bacilli tuberculosis and a good clearly defined contrast stain. The 5 per cent. hydrochloric acid alcohol was finally selected as being the best decolorizing agent, because it decolorizes with moderate rapidity and thoroughness, and, at the same sime, is perfectly safe. Preparations have been allowed to remain one hour in this solution and the bacilli tuberculosis were not decolorized. The 3 per cent. hydrocholoric acid alcohol makes very often a more brilliantly contrasted preparation, but is not adapted for general use, because it may allow too much red to stay in the preparation after being decolorized for one minute or so.

If particles of foreign matter be abundant in the preparation, it can be comparatively freed from them by passing a selected portion of the sputum to and fro under the surface of some sterilized water contained in a Petri dish. The part selected should be as much tenacious muco-purulent sputum as can be taken up by a platinum needle or fine forceps. The less adherent portions are washed away and the part which has remained is smeared on the cover glass.

It may happen with the use of an ordinary one-twelfth oil immersion lens that a preparation shows a tinted form which resembles the bacillus tuberculosis, and still is not definite enough for a positive diagnosis. Crystals of cholesterin, when very few and scattered, may also cause doubt. I have found, however, that the apochromatic lens of Zeiss enables a positive diagnosis to be made in all such cases. Tinted forms which appear to be suspiciously pink, with an ordinary one-twelfth oil immersion, are readily shown in their true differentiation by means of the apochromatic lens.

The introduction of the use of the mechanical stage has been found to be of much value. Those specimens which, by ordinary examination appear to contain no bacilli tuberculosis, are often by means of the mechanical stage shown to contain one or more. The careful and thorough examination of two smears, each 14 mm. square, may be justly considered as enabling a diagnosis to be made in the majority of fairly well developed cases of pulmonary tuberculosis, and in many of the cases in the initial stages. In July, 1896, certain additions were made to the questions on the blank form which accompanies the specimens, namely, as to (*a*) the presence of fever (*b*), physical signs and significant symptoms. These blanks have been very well received and, as a rule, have been carefully filled out by the physican in charge of the case. Cases which have given a negative result with the regular examination of two smears, and in which the physican has given a history diagnostic of tuberculosis, have occasionally been examined further and bacilli have been found in the third, fourth, etc., preparation. Just how many preparations must be examined to arrive at a positive negative diagnosis cannot be definitely determined.

The various methods of reducing or concentrating the volume of the sputum, with a view of obtaining the bacilli in greater numbers in the residue, have been investigated, and the conclusion has been reached that, with the exception of a few sputa specially adapted to such processes, the methods are impracticable. The careful selection of the cheesy, purulent or muco-purulent portions of the sputum for examination gives, as a rule, the best results.

The use of hot-air oven, kept at a temperature below 65 degrees C., has been found of use as an aid to facilitate the drying of the smears.

2D. EXAMINATIONS FOR PATHOGENIC BACTERIA OTHER THAN THE BACILLUS TUBERCULOSIS IN PULMONARY TUBERCULOSIS AND IN NON-TUBERCULAR PULMONARY DISEASE.

(*a*) *Pulmonary Tuberculosis with Concurrent Infection*—The presence of pathogenic bacteria in pulmonary tuberculosis, other than the bacillus tuberculosis, is of frequent occurrence and has a direct relation to the tubecular process. The presence of pyogenic bacteria favors the extension of the tubercular inflammation and usually causes fever. In marked cases it may cause all the symptoms of septicæmia. The tubercular affection may occupy small areas and the prognosis be made to appear serious by the pyogenic bacteria, in which case, by proper treatment, the pyogenic bacteria may be made to disappear, and the tubercular process be confined to its own areas. The infections due to pyogenic bacteria usually yield to climatic and medical treatment.

Thirty-eight selected specimens of sputum from the cases of pulmonary tuberculosis examined for the pyogenic streptococci have shown that these were present, constituting in each of these cases pulmonary tuberculosis, with a concurrent infection due to the pyogenic streptococci.

The technique of examination has been to use the Koch-Kitasato method of washing a "ball" of sputum, thus freeing it from the bacteria of the upper air passages and the mouth. The washed sputum thus obtained is then stained, and in doubtful cases cultures should be made.

The Koch-Kitastato method of washing the sputum consists of first selecting as much sputum as can be conveniently held on the end of a platinum needle or between the points of a fine forceps. The sputum selected should be a small tenacious mass, such as usually constitutes a small compact expectoration. This is technically designated as a "ball." This sputum is then passed through sterilized water, contained in two or three Petri dishes, until all the loosely adherent portions are freed from the central zone of the sputum. The sputum must be perfectly fresh, as otherwise the bacteria of the mouth and upper air passages become so intimately mixed with it as to render their separation uncertain.

The diplococcus pneumoniæ was found to complicate 55 selected cases of pulmonary tuberculosis. The histories of these cases of pulmonary tuberculosis with concurrent infection, due to the diplococcus pneumoniæ, seem to indicate that the diplococcus pneumoniæ accompanies various degrees of inflammation, and is of a varying significance. A well-marked infection with the diplococcus pneumoniæ complicating a pulmonary tuberculosis has a serious significance and is a source of great danger. Some cases of pulmonary tuberculosis, with a few diplococci pneumonia, constituting a slight infection, do not appear to be affected by their presence.

The micrococcus tetragenus has been found in a number of the cases examined. Under favorable conditions this micrococcus may cause fever. It has been found in two cases of septicaemia.

(*b*) *Examinations for Bacteria in Non-tubercular Pulmonary Infections*—It has been ascertained that bacteria other than the bacillus tuberculosis may occur in pulmonary infections and cause symptoms which more or less closely resemble those of pulmonary tuberculosis. The bacteria chiefly found in these cases have been the pyogenic streptococci, diplococcus pneumoniæ and the influenza bacilli.

The pyogenic streptococci have been found in 13 cases selected for examination during the past year. In these cases no bacilli tuberculosis were found, although the cases were those of suspected pulmonary tuberculosis.

The diplococcus pneumoniæ has been found during the past year in 48 cases, selected for examination, with a similar history.

Eight cases of suspected influenza were examined with negative results.

3D. SOME OBSERVATIONS UPON THE INFECTIOUSNESS OF SPUTUM AND ITS DISINFECTION.

The observations of the infectiousness of sputum were confined to the determination of the significance of the bacteria in sputum from cases of non-tubercular pulmonary diseases, such as chronic bronchitis, in which bacteria are present, but seem to taking no active part in the disease. The sputum was taken from the cases before treatment and after treatment by inhalations of antiseptic substances.

The injection of the sputum from the cases before treatment was uniformly followed by the death of the animal injected. The injection of the sputum from the cases after treatment caused no ill effects in the animal injected.

The observations on the disinfection of sputum were directed to an attempt to find some substance which would be adapted to penetrate lumps of sputum without causing coagulation, at the same time destroying the bacteria contained therein. The substance which most closely fulfilled these conditions was a watery solution of one-half of one per cent. of carbolic acid containing twenty parts of English salt.

4TH. BOVINE TUBERCULOSIS.

Specimens of portions of the lungs from twenty cows suspected to be tubercular have been received.

The cheesy and suspected areas of infiltration have been brought into suspension in sterilized water and injected into the peritoneal cavity of guinea pigs, with a view to cause tuberculosis and prove the infectiousness of the material. The work in this respect is still in progress, and no definite results can, as yet, be reported.

(Signed) C. B. FITZPATRICK, M. D.

Conclusion.

In concluding this report, it is my pleasant duty to refer to the conscientious performance of their work by the inspectors and employees of this Division who are under my immediate supervision. The increase in the working force has not been commensurate with the great expansion in the executive and routine branches of the work of the Division which has taken place during 1896, and the task of successfully carrying on this work has been therefore very onerous on all concerned during the greater part of the year. Under these difficult circumstances, the intelligent fidelity manifested by the inspectors and other employees in the discharge of their duties is specially commendable.

Respectfully submitted,
ALFRED L. BEEBE, PH. B.,
Assistant Director, Diagnosis Bacteriological Laboratory.

REPORT FROM THE HOSPITAL BACTERIOLOGICAL LABORATORY.

To the Pathologist and Director of Bacteriological Laboratories:

SIR—I have the honor to submit the following report regarding the work performed at the Willard Parker Hospital Laboratory during the year 1896.

The bacteriological work carried on may be roughly divided into that which is of a partly routine nature and that which is purely experimental. The routine work consists in the preparation of diphtheria toxin and antitoxin, of tetanus toxin and antitoxin, of tuberculin and of mallein; also the testing of the virulence of diphtheria bacilli from mild sore throats, of samples of milk and other fluids for tubercular bacilli, and of vaccine virus.

The experimental work has been chiefly devoted to the development of bactericidal and antitoxic substances in animals, with the hope that these substances might prove of value in streptococcus, pneumococcus, typhoid and cholera infections.

Considerable experimental work has also been performed upon methods for isolating the typhoid bacilli from feces and water by Elsner's and other methods, and upon the reaction of the typhoid bacilli to serum taken from persons suffering from typhoid fever.

The following statement gives in some detail the experimental and routine work carried out and the results obtained:

The Preparation of Diphtheria Toxin.

The method of producing diphtheria toxin does not differ in any respect from that formulated by us early in January, after last year's experimental work, the summary of which is as follows:

Toxin, of sufficient strength to kill a 400 gramme guinea-pig in three days and a half in a dose of 0.025 cubic centimetre, developed in suitable bouillon, contained in ordinary Erlenmeyer flasks, within a period of twenty-four hours. In such bouillon, the toxin reached its greatest strength in from four to seven days (0.005 cubic centimetre killing a 500 gramme guinea-pig in three days). This period of time covered that of the greatest growth of the bacilli, as shown both by the appearance of the culture and by the number of colonies developing on agar plates.

The bodies of the diphtheria bacilli did not at any time contain toxin in considerable amounts.

The type of growth of the bacilli and the rapidity and extent of the production of toxin depended more on the reaction of the bouillon than upon any other single factor.

The best results were obtained in bouillon which, after being neutralized to litmus, had about seven cubic centimetres of normal soda solution added to each litre. An excessive amount of either acid or alkali prevented the development of toxin.

Strong toxin was produced in bouillon containing peptone ranging from one to ten per cent. The strength of toxin averaged greater in the two and four per cent. peptone solutions than in the one per cent. solution.

When the stage of acid reaction was brief and the degree of acidity probably slight, strong toxin developed while the culture bouillon was still acid; but when the stage of acid reaction was prolonged, little, if any, toxin was produced until just before the fluid became alkaline.

Glucose is deleterious to the growth of the diphtheria bacillus and to the production of toxin when it is present in sufficient amounts to cause by its disintegration too great a degree of acidity in the fluid culture. When the acid resulting from decomposition of glucose is neutralized by the addition of alkali, the diphtheria bacillus again grows abundantly. Glucose is not present, at least as a rule, in sufficient amounts in the meat as obtained from the New York butchers to prevent the rapid production of strong toxin if the bouillon is made sufficiently alkaline.

In our experiments, when other conditions were similar, the strength of the toxin was in proportion to the virulence and vigor of growth of the bacillus employed.

As a result of this work, a much more concentrated solution of diphtheria toxin has been produced at a considerable saving of both time and expense. Furthermore, the amounts required for the inoculations of the horses during the process of immunization are smaller than heretofore and a higher grade of antitoxin is obtained more quickly.

The Production of Diptheria Antitoxin.

During the past year the Health Department has succeeded in obtaining diphtheria antitoxin containing 500 antitoxin units (Behring) per c. c., and has discarded the use of the weak serum

No. 3, containing 100 units per c. c. The weakest antitoxin now in use contains 150 units per c. c. The first stronger antitoxin was obtained on December 28, 1895, and contained 200 antitoxin units per c. c. In January, 1896, 300 and 400 unit serum was obtained, and in May one horse gave a serum of 500 unit strength. Since then the Laboratory has had full supplies of serum ranging in strength from 150 units to 500 units.

At the beginning of the year there were 15 horses giving diphtheria antitoxin. Of these 15 horses, 4 are now in use; 1 new horse in addition is giving serum, and 6 are being inoculated up to the necessary strength. The following is the number of bleedings, amount of blood drawn, and the number of bottles put up for distribution and sale:

Number of bleedings, 114.

Number of flasks of blood, 642.

Number of vials of antitoxin, 17,853, as follows:

Grade of Antitoxin.	Number of Vials.	C. C. in each Vial, Approx.	Grade of Antitoxin.	Number of Vials.	C. C. in each Vial, Approx.
No. 2	1,443	10 c. c.	No. 5	3,299	5 c. c.
No. 3	2,139	10 c. c.	No. 6	1,136	5 c. c.
No. 3a	2,355	5 c. c.	No. 7	898	3 c. c.
No. 4	4,598	5 c. c.	Inspectors	1,980	20, 10, 5, 2 c.c.

There were 362 animal tests made in determining the strength of 114 bleedings of antitoxic serum, new toxins and the control toxins.

The attempt has been made to separate the antitoxin from the serum. The method proposed by Brieger, in Zeitschrift fur Hygiene und Infectionskrankheiten of February 21, 1896, was mainly used. He proposed two methods. In the first, he adds to the diluted antitoxic serum sodium chloride, potassium chloride, or potassium iodide, and allows to stand in the thermostat at 30–37 degrees C. from 18–20 hours. The precipitate contains the antitoxin, which can be separated from the albumen by dialysis. The second method proves more satisfactory. To 10 c. c. of serum, 50 c. c. of water is added and 20 c. c. of 1 per cent. zinc chloride solution. After allowing the percipitate to settle, it is filtered off and dissolved in a weak sodium hydroxide solution. Carbon dioxide is now run through the solution and the precipitate again filtered off. The filtrate contains the antitoxin. This is evaporated in a vacuum at 37 degrees C. The zinc albuminate present dissolves for the most part in water, and the residue (the antitoxin) is soluble in sodium chloride, or better in weak sodium hydroxide.

In the laboratory experiments made by us, the precipitate obtained by addition of zinc chloride was found, when dissolved in sodium hydroxide, to possess antitoxic power; but manipulation (*i. e.*, treatment with carbon dioxide and filtering) weakens it, and the residue obtained after the final evaporation has never yet contained antitoxin in appreciable quantity. The experiments are still being carried on with the hope of ultimate success.

Some work has been done with a view to prepare an artificial medium of known constituents for the growth of the diphtheria bacilli and development of toxin. The results are not nearly so satisfactory as those obtained from meat broth medium.

The Virulence of Diphtheria Bacilli Obtained from Mild Throat Inflammations.

The examinations made of the secretions of the throat, in cases which physicians have diagnosed as simple acute inflammations, have frequently shown the presence of typical Loeffler bacilli. In order to show the exact value to be attached to bacilli of such appearance in the ordinary routine bacteriological examination, some investigations were made as to the virulence of the diphtheria bacilli found in the cultures from such cases. The cultures were chosen from those received daily at the Diagnosis Bacteriological Laboratory, those being selected which showed morphologically typical Loeffler bacilli, and each of which was accompanied by a slip giving one of the following diagnoses made by the physician in charge; tonsilitis, follicular, ulcerative or membraneous tonsilitis, pseudo-diphtheretic tonsilitis, pseudo-diphtheria, acute pharyngitis or diphtheria with an interrogation point following.

The preliminary microscopical examination, as well as the keeping of the records of the cases, was in charge of Mr. Alfred L. Beebe, Assistant director of the Diagnosis Bacteriological Laboratory. When the cultures were shown to contain morphologically typical Loeffler bacili, the tubes were sent to the Hospital Laboratory for further testing. This work consisted in making agar plates from the serum tube cultures and after twenty-four hours growth in the thermostat at 37 degrees C., inoculating broth tubes from isolated colonies of the diphtheria bacillus. Forty-eight hours growth of those broth cultures which proved to be pure were inoculated into guinea pigs. On account of contaminating bacteria, it was impossible to obtain pure cultures from all of the serum tubes.

The results, in all cases where it was possible to separate the Loeffler bacili in pure culture, are given in the following table :

DATE.		Laboratory Number of Case.	MICROSCOPIC EXAMINATION.	CLINICAL DIAGNOSIS.	VIRULENCE OF BACILLI.		
					Weight of Guinea Pigs in Grm.	Amount Inoculated, in c.c.	Result of Inoculation.
Jan.	7	238	Few typical L	Doubtful.	750	2.00	D. 40 hours.
"	7	331	Nearly pure typical L	Diphtheria (?)	165	1.00	D. 21 hours.
"	7	333	Abundant typical L	Ulcerative tonsilitis	275	1.00	D. 40 hours.
"	13	494	Many typical L	Membranous tonsilitis	760	2.00	D. 24 hours.
"	13	506	"	"	310	1.00	D. 21 hours.
"	14	562	Few typical L.; many very suspicious bacilli.	Diphtheria (?)	365	2.00	D. 24 hours.
"	16	679	Abundant typical L	Tonsilitis	265	2.00	D. 40 hours.
"	16	680	"	Diphtheria (?)	708	2.00	D. 40 hours.
"	18	796	"	Tonsilitis	754	2.00	Sick, much infiltration.
"	19	821	Many typical L	Follicular tonsilitis	310	1.00	D. 3 days.
"	19	822	Abundant typical L	Pseudo diphtheria	727	1.00	D. 60 hours.
"	19	823	Abundant small, rather atypical L.	Tonsilitis	229	1.00	Lived.
"	23	633	Abundant large typical L	Doubtful.	357	1.00	"
"	23	1027	Abundant typical L	Nasal diphtheria (?)	453	1.00	D. 40 hours.
"	23	1084	"	Diphtheria (?)	435	1.00	D. 24 hours.
"	23	1087	Moderate number typical L.	"	670	1.00	D. 40 hours.
"	30	1152	Abundant typical L	Follicular tonsilitis	535	1.00	D. 24 hours.
"	30	1153	Many typical L	"	431	1.00	D. 40 hours.
"	30	1217	Abundant typical L	Tonsilitis membranous	586	1.00	D. 40 hours.
"	30	1218	"	Diphtheria (?)	517	1.00	D. 3½ days.
"	29	1223	"	Pseudo diphtheria	580	1.00	D. 40 hours.
"	30	1228	"	"	700	1.00	D. 21 hours.
Feb.	4	1432	"	Tonsilitis membrane	290	0.75	D. 40 hours.
....		1511	"	Follicular tonsilitis	290	0.50	D. 2 days.
Feb.	11	1731	"	Non-diphtheretic tonsillar infection	290	1.00	D. 23 hours.
"	11	1733	"	Doubtful.	283	1.00	D. 40 hours.
"	11	1735	B. typical in shape, but evenly stained.	Follicular tonsilitis	295	1.00	D. 40 hours.
"	11	1931	Many typical L	Tonsilitis (?)	307	1.00	D. 23 hours.
"	16	1932	"	Diphtheria (?)	285	1.00	D. 23 hours.
"	27	2263	Abundant typical L	"	317	1.00	D. 24 hours.
"	27	2280	"	"	378	1.00	D. 40 hours.
Mar.	4	2447	"	Pharyngeal diphtheria (?)	340	1.00	D. 40 hours.
"	6	2599	"	Rhinitis and laryngitis	300	1.00	D. 40 hours.
"	8	2601	"	Pseudo diphtheria	300	1.00	D. 40 hours.
"	11	2694	Many typical L	Acute tonsilitis	310	1.00	D. 40 hours.
"	11	2695	Few typical L	"	350	1.00	D. 40 hours.
"	17	2877	Typical and atypical L	Diphtheria (?)	297	1.00	D. 2 days.
"	17	2899	Abundant typical L	Ulcerative tonsilitis	313	1.00	D. 24 hours.
"	17	2901	"	Diphtheria (?)	290	1.00	D. 24 hours.
Apr.	5	3420	Many typical L	Follicular tonsilitis	...	....	D.
"	6	3481	"	"	...	....	D.
"	26	4140	"	"	...	....	D.
"	30	4291	"	"	...	....	D.
May	7	4526	Abundant typical L	"	...	....	Lived.
"	11	4685	Many typical L	"	...	....	D.
"	16	4868	Few typical L	"	...	....	Lived.
"	16	4875	Many typical L	"	...	....	D.
"	17	4877	"	"	...	....	D.

From a study of this table it is seen that in 48 cases of the required type, pure cultures were obtained, and in only three of these were the organisms found to be non-virulent. In 44 of these 48 cases the subsequent history was obtained from the attending physician by the Inspectors of the Health Department, and inquiry was made in each instance as to the source of infection and as to the occurrence of other cases in the family. Fourteen of the cases gave a history of typical acute follicular tonsilitis of a mild type, duration from three to five days. Three other cases ran a course of simple acute pharyngitis mild in character. In none of these seventeen cases did a membrane appear at any time during the disease, and there was nothing in the clinical history to suggest diphtheria. In two cases with an early history of acute follicular tonsilitis, croup symptoms developed later, a very slight attack in one, and in the other after convalescence was fully established.

In the other 25 cases, the patients ultimately developed characteristic symptoms of diphtheria.

Nineteen cases, were, therefore, clinically tonsilitis or pharyngitis. In seventeen of these, according to the animal tests, the bacilli were fully virulent, and in ten out of the fifteen, where a history could be obtained, it was found that there was reasonable evidence of contagion.

As a result of these investigations, it is shown that when typical Loeffler bacilli are found in the secretions of throats presenting clinically any symptoms of an acute inflammatory character they can be considered as virulent and capable of becoming a source of infection, and such cases should be isolated and treated from a sanitary standpoint as any case of diphtheria.

The Production of Tetanus Toxin and Antitoxin.

The following work has been done with the tetanus bacillus and the preparation of its toxin and antitoxin. The pure culture of tetanus which was obtained through the kindness of Dr. Hewlett at the British Institute of Preventive Medicine proved to have lost its virulence when we began work with it in January, 1896. The toxins obtained from its growth in broth were very weak, 0.05 c. c. failing to kill a guinea pig. After several attempts to increase its virulence had failed it occurred to us that a mixed infection was the usual clinical feature as seen in man, and two animals were therefore injected with a half cubic centimetre of tetanus broth and a broth culture of the bacillus rosaeous metalloides respectively. These animals died in 24 hours. The tetanus was now grown under hydrogen as before, but with the addition of a culture of the metalloides, and it was found that 0.001 c. c. of the filtered toxins would surely kill in 5 to 6 days. After a few generations, a toxin was obtained which killed in a dose of 0.001 c. c. in 60 hours. Further experiments showed that a dose of tetanus toxin which kills in 60 hours is ten times the minimum fatal dose which will surely kill in 6 or 7 days. The tetanus was separated from the metalloides by heating a culture, in which the tetanus was sporulated, at 80 degrees C. for one hour, and was thus obtained pure. The cultures from these pure cultures regularly formed toxines of 0.001 c. c. strength. By further experimenting, it was found that the reaction of the broth, and the length of time the culture was allowed to grow, made also a great difference in the strength of the toxins. The best results have been obtained with freshly prepared broth containing 2 per cent. peptone, to which seven-twelfths c. c. of normal soda has been added after the broth was proven neutral to litmus.

Great trouble has been experienced in keeping a tetanus toxin whose strength was known and could be depended upon. Toxins which on the day of filtration tested 0.001 c. c. fatal in 60 hours, in two days showed 0.001 c. c. fatal in 6 days, and 6 days later 0.01 c. c. fatal in 5 or 6 days. The toxins have been prepared with one-half per cent. carbolic acid in sealed bottles and kept in the ice chest, but have failed to retain their strength. Some specimens would remain fairly constant at 0.01 c. c. fatal dose for a month, while others would lose their strength so rapidly that when 0.01 c. c. or 0.001 c. c. would kill in 5 days, the same dose administered on the fifth day (*i. e.*, the day of the completion of the test), would not give even a tetanic symptom. Pouring toxins from one bottle to another will diminish the strength of the toxins one-tenth. The routine practice now is to prepare fresh toxin every 10 days and keep the strength constantly tested. Even by this means the most annoying and troublesome variability in strength is constantly encountered. We have some experiments in progress by means of which we hope to be able to retain a fairly constant strength in the toxin. During the year 171 tests have been made with the toxin.

For the production of tetanus antitoxin three horses have been used. One died from tetanus in course of the immunization and two are at present producing the serum. Horse No. 38 as the first to receive injections, and proving rather insensitive to the toxins, the immunization was rapidly pushed, until in three months the animal gave a serum, the immunizing power of which was 1 to 300,000. A month later the serum was 1:1,400,000, while in another month it was 1:3,350,000. At present, the serum of this horse is 1:7,000,000. This is reckoned on the protection of the animal against the six-day fatal dose of toxin. If reckoned against the three-day fatal dose (*i. e.*, against ten times the minimum fatal dose of toxin) the strength is 1:2,000,000. Horse No. 2, at the beginning of his immunization, was exceedingly sensitive to the tetanus toxin and once nearly died from tetanus, though but a very small dose of toxin had been given him. He was, therefore, immunized very slowly, and at the end of nine months his serum showed a strength of 1:13,000,000, calculating the protection against the six-day fatal dose. Against the ten-times fatal dose it is 1:5,000,000. Two hundred and four tests have been made with the antitoxin. Horse No. 38 has been bled five times; horse No. 2, twice. The tetanus antitoxin sent out during the year from this Laboratory for the cure and immunization of man and animals has amounted to 3930 c. c.

Bacteriological Examinations of Vaccine Virus.

In examining the vaccine from the Department's vaccine station, 280 tests have been made of the vaccine from 159 calves. These tests show the following facts: (1) The variable number of micro-organisms in the fresh glycerinated vaccine mixture, usually a large number. (2) The progressive disappearance of the micro-organisms, at times rapid. (3) The practical sterility of the glycerinated vaccine after the lapse of a moderate, but varying, period of time.

The tests have been made in the following manner : A specimen of the vaccine, as prepared for use, has been sent to the Laboratory and a loop full taken, mixed with nutrient agar and plated. The plate is allowed to stand 24 hours at body temperature and the colonies counted. The number of colonies are taken as the best index to the number of micro-organisms present, as theoretically, if the bacteria are sufficiently isolated, each colony should develop from a single micro-organism. The loop full employed represents very fairly the amount of vaccine used in a single vaccination.

The following table exhibits the varying number of micro-organisms present in fresh glycerinated vaccine:

Number of Calf.	Time Elapsed Between Preparation and Test of Vaccine.	Number of Colonies Found.	Number of Calf.	Time Elapsed Between Preparation and Test of Vaccine.	Number of Colonies Found.
42	2 days.	734	60	5 days.	0
43	4 days.	118	62	4 days.	3
44	1 day.	1,174	63	2 days.	9
46	"	2,520	125	1 day.	183,915
50	"	2	124	"	56,160
51	"	44	133	"	116,064
52	"	72	134	Few hours.	30,876
53	"	336	144	"	41,292
54	"	3,575	145	"	26
55	"	4,968	157	"	359
56	"	13,872			

The progressive diminution of the micro-organisms, at times rapid, and the practical sterility of the glycerinated vaccine, after a short period of time, is well shown by the following examples:

Number of Calf.	Time Elapsed Between Preparation and Test of Vaccine.	Number of Colonies Found.	Number of Calf.	Time Elapsed Between Preparation and Test of Vaccine.	Number of Colonies Found.
134	Few hours.	30,876	42	19 days.	2
"	2 days.	1,289	43	4 days.	118
"	5 days.	115	"	21 days.	4
"	7 days.	2	46	1 day.	2,520
"	9 days.	0	"	18 days.	0
135	Few hours.	2,072	53	1 day.	336
"	2 days.	106	"	11 days.	0
"	5 days.	22	54	1 day.	3,575
"	7 days.	1	"	9 days.	2
"	9 days.	0	55	1 day.	4,963
42	2 days.	734	"	9 days.	0

The following tests, made on November 11, of specimens of vaccine prepared some time before, also show this point :

Number of Calf.	Time Elapsed between Preparation and Test of Vaccine.		Number of Colonies Found.	
	FIRST TEST.	SECOND TEST, MADE NOVEMBER 11.	FIRST TEST.	TEST MADE NOV. 11.
130	1 day	6 months, 21 days	1,996	27
136	1 day	6 months, 16 days	Innumerable.	0
137	1 day	6 months, 16 days	774	12
139	3 days	6 months, 15 days	6,758	38
141	2 days	5 months, 9 days	0	0
142	1 day	5 months, 8 days	3	1
143	1 day	5 months, 8 days	0	0
144	Few hours	5 months, 8 days	41,292	9
146	2 days	5 months, 2 days	24,552	0
147	2 days	5 months, 2 days	952	2
148	1 day	5 months	93,177	6
149	Few hours	4 months, 25 days	1,705	1
151	7 days	4 months, 14 days	230	0
152	5 days	5 months, 9 days	132	0
157	1 day	2 months, 8 days	359	0
158	13 days	2 months, 2 days	39	2

Koch, in 1881, showed the germicidal power of glycerine, and some experiments made by one of us in 1892 agreed with his results. The organisms most resistant to the action of glycerine are some of the micrococci, which seems to possess a "resistant form," and the spore bearing bacilli. One of the most resistant spores known is that of the bacillus subtilis, or common hay bacillus, a frequent and most common contamination of everything around stables. No experiments have as yet been completed to separate out the species of the micro-organisms found, but such experiments are now in progress.

Experimental Investigations Relating to the Streptococcus.

The work on this organism for the past year may be classified as follows: (1) Testing the virulence of streptococci from various sources. (2) increasing the virulence of various streptococci. (3) Production of streptococcus toxin. (4) Immunization of animals for the purpose of obtaining a curative serum. (5) Testing the serum of immunized animals.

Tests of the virulence of various streptococci were made to find a streptococcus possessing originally great virulence. For this purpose streptococci were obtained from cases of the following diseases: Erysipelas, cellulitis, various abscesses, pneumonia, diphtheria. From no one of these was a streptococcus obtained which possessed more than a moderate degree of virulence in rabbits. Marmorek's ascitic fluid broth was the culture medium used. In order to increase the virulence, passage of the organisms through rabbits was tried, but with very little success at first. Later, this method, which is classic, has given better results.

A streptococcus obtained from the Loomis laboratory, and which passed through thirty rabbits before it was received at this laboratory, possesses now such a virulence that 0.000001 of a twenty-four hour ascitic broth culture will kill a medium sized rabbit within twenty-four hours.

None of the methods so far employed for the production of streptococcus toxin have given any positive results.

The animals employed for immunization are rabbits, sheep, a jackass and horses. In rabbits the dead cultures, killed by exposure to 50° C. for one hour, are used for the inoculations. For the larger animals, the living cultures are used, one receiving a seven-day broth culture, and the others a twenty-four hour ascitic-broth culture. The inoculations are made once a week if the animals have recovered from the effects of the previous dose within that time. These animals are able to support large doses of a streptococcus culture which has never been very virulent in rabbits, but their serum tested at various intervals has not until very recently shown any antitoxic or bactericidal properties.

Inoculation of Animals for the Production of Curative and Protective Serums.

In addition to the regular work done for the production of diphtheria and tetanus antitoxins, and the experimental work on the streptococcus, experimental inoculations have been carried on with the diploccus pneumonia, the cholera spirillum, the B. typhosus and the B. coli communis, with the object of producing curative and protective serums available for therapeutic purposes.

The experiments with the pneumococcus have been on similar lines to those with the streptococcus, except that they have been confined to the smaller animals. They have as yet given no encouraging results.

Goats are being used for the cholera inoculations and are now receiving large weekly injections of 24-hour broth cultures.

In the typhoid work, a horse and a goat have been used. Frequent tests of the horse serum have been made for the Widal reaction, and the last specimens have shown it in remarkably high dilutions. This serum also shows considerable protective power, ¼ c.c. when mixed with a fatal dose of typhoid bacilli protecting guinea pigs. Larger doses of serum inoculated subcutaneously into guinea pigs were also found to protect against fatal intraperitoneal doses administered 24 hours afterward.

The coli experiments have been made on goats and guinea pigs, and are as yet inconclusive.

Experiments are being carried out upon the value of the serum obtained from animals immunized to the typhoid and colon bacilli and to the cholera spirilla, as an aid to the differential diagnosis of such closely related organisms as the B. typhosus and the colon group, the spirilla cholerae Asiaticae and the various spirilla which so closely simulate it.

Production of Tuberculin.

Tuberculin has been prepared in large quantities for the injection of cattle suspected to have tuberculosis. It has been prepared in the usual way from 6 to 8 weeks' old cultures grown upon glycerine bouillon.

Production of Mallein.

Mallein has been prepared in the usual way from bouillon cultures of virulent glanders bacilli. Considerable quantities have been employed for testing animals suspected to have glanders.

Diagnosis of Rabies in Animals.

Since October, 1896, the Health Department has been ready to inoculate rabbits from all animals sent which were supposed to have rabies, for the purpose of determining whether the suspected animals were so affected.

On November 25, 1896, a dog which had bitten one or more persons, was sent by Dr. Pedro F. Francke, Far Rockaway, L. I. Two rabbits were inoculated from the medulla of this dog. They died after a period of twenty days from the time of inoculation, having exhibited typical symptoms of rabies.

In November there was begun a series of inoculations of rabbits with rabies, for the purpose of ultimately taking up the regular protective treatment of persons bitten by dogs or other animals supposed to have rabies. For this purpose, it is necessary to obtain an ascending series of spinal cords, attenuated by drying. This is accomplished in the following manner :

Every day two rabbits are inoculated beneath the dura with a broth emulsion of the "fixed virus," *i. e.*, a virus which has passed successively through rabbits until its virulence is no further increased. As a result of these inoculations one or two rabbits die each day. From these rabbits the spinal cord and brains are removed under asceptic precautions. The spinal cord is divided into three portions, and each part is suspended in a litre bottle having two apertures, one at the top and the other one inch from the base, both plugged with cotton. The bottom of the bottle is covered up to the level of the side aperture with potasium hydrate. These bottles, containing the pieces of spinal cord, are placed in a small dark room, the temperature of which remains between 20° and 25° C.

For protection either in animals or man, inoculations are begun with portions of a cord dried for fourteen days. From day to day inoculations are made with cords dried for shorter periods, so that finally cords dried for but three days are employed.

Examination for Widal's Test of Specimens of Dried Blood and Serum from Cases of Suspected Typhoid Fever.

These examinations were commenced early in October. Up to November 5 the blood from 32 cases of undoubted typhoid fever, and that from several doubtful and non-typhoid cases had been examined. The results obtained and the conclusions drawn were as follows :

Total cases examined in which a diagnosis of typhoid fever, or convalescence from typhoid, was made, were 32. These gave—

Marked immediate typhoid reaction in 25.

Moderately well devoloped reaction within two hours in 6.

No reaction (eightieth day and small amount of blood) in 1.

In 31 of these 32 cases a correct diagnosis would have been made from the blood reaction.

Total cases examined in which a diagnosis of possible typhoid was made, 2. Both of these gave a decided reaction, and the examination of the blood permitted a positive diagnosis to be made.

Total cases examined suffering from other diseases, 10 (phthisis, 5 ; tuberculosis, 1 ; scarlet fever, 2 ; carcinoma, 1 ; pelvic disease, 1). These gave—

No reaction in 9.

Slight reaction (less than with any of the typhoid cases in 1).

Total cases examined of normal blood, 4. All of these gave no reaction.

The examinations above recorded confirm the results published by Widal, Johnston and others, that a more or less complete clumping of the typhoid bacilli, with accompanying loss of mobility, will occur if these bacilli are mixed with the blood or serum from patients suffering from typhoid fever. It seems probable that in the majority of cases this reaction will be sufficiently marked to enable a positive diagnosis to be made. In a small minority it may be sufficient only to make a probable diagnosis. The single failure was in a case in which 80 days had elapsed from the beginning of illness and in which the amount of dried blood was insufficient. It will take further examinations to show whether, with proper technique, an absolute failure in the reaction will enable us positively to exclude the diagnosis of typhoid fever.

The examination of 10 cases sick with other disases and of four healthy persons, gave in 13 so little, if any, reaction that no suspicion of typhoid occurred. The reaction of the typhoid bacilli to the blood of one tubercular patient was, though less than in any of the typhoid cases, sufficient, with our present limited experience, to prevent the positive exclusion of typhoid fever.

Certainly these results when considered with those already published, would lead us to give this reaction a high, perhaps a very high, diagnostic value.

The results obtained in this limited series of cases, when considered in connection with those reported by others, determined the Health Department to undertake the examination of specimens of blood from suspected cases of typhoid fever occurring throughout the city, whenever the physicians in attendance so requested.

A circular of information was, therefore, issued and distributed, and glass slides for transmitting specimens of dried blood, with directions and blanks for recording clinical data, were placed at the various stations throughout the city, already established by the Department for the distribution of culture tubes, etc.

From November 5 to January 1, specimens of blood from 200 cases in which complete histories ere obtained, were examined. The results were as follows :

	Number of Cases Examined.	Reaction Positive in 1-10 Solution on First Examination.	Reaction Negative, on First Examination.
umber of cases finally believed to be typhoid............	140	100	40
umber of cases finally believed not to be typhoid........	57	0	57
umber of cases remaining in doubt, but regarded by the clinical observers as probably not typhoid..............	3	3	0
Total number of cases of suspected typhoid fever examined.........................	200	103	97

The duration of the disease at the time of the examination was obtained in 108 cases. The esults in these were as follows :

Time When Specimens Were Collected.	Number of Cases Examined.	Reaction in 1-10 Dilution.		Per Cent. of Positive Results on First Examination.
		Positive.	Negative.	
rom third to seventh day.....	19	12	7	63
uring second week................................	39	23	16	59
uring third week................................	24	19	5	79
uring fourth week................................	9	8	1	88.8
During second month..............................	17	13	4	76
	108	75	33	70

The above results show that the presence of the typhoid (Widal's) reaction in a one-tenth dilution of blood or serum from any case indicates that in all probability the case is one of typhoid fever. The absence of the reaction in the blood does not, however, exclude the diagnosis of typhoid fever, as it is found to be absent in from 10 to 40 per cent. of the cases, according to the time the fever has lasted.

A study of the histories of the cases indicates that the reason for the smaller per cent. of positive results during the second week is undoubtedly to be found in the fact that during the first week cases were sent without regard to their type, while in the later cases, as a rule, only those running an atypical course were selected.

Late in December experiments were begun upon a more careful quantitative estimation of the amount of agglutinating substances present in the blood of patients sick with typhoid fever and of those sick with other diseases. It is hoped to arrive in this way at more positive results, both in making and excluding the diagnosis of typhoid fever.

Elsner's Method for Obtaining Typhoid Bacilli from Fæces and Water.

We have carried on considerable experimental work with Elsner's potato iodide of potassium gelatine, but found it of but little more service than other previously used methods.

Division of Laboratory Work.

In so far as has been practical, each one of the bacteriologists has been assigned some special department of work. Thus the preparation of tetanus toxin and antitoxin and that of mallein has been under the direction of Dr. Alexander Lambert. The experimental work upon streptococci and the development of a curative serum has been under the supervision of Dr. Anna W. Williams. The preparation of diphtheria toxin and antitoxin, its testing, bottling and chemical examination, have been under the joint care of Dr. George P. Biggs, Dr. A. W. Williams and Mr. Atkinson. In the examination of the specimens of typhoid blood for Widal's reaction, Drs. Williams, Lambert and myself all shared.

Respectfully submitted,
WM. H. PARK, M. D.,
Assistant Director, Hospital Bacteriological Laboratory.

REPORT FROM THE VACCINE LABORATORY.

To the Pathologist and Director of Bacteriological Laboratories:

SIR—We have the honor to make the following report of the work done by the Vaccine Laboratory during the past year. This report may be prefaced by a brief history of the production of vaccine virus by the New York City Health Department.

Through the efforts of the Commissioners of the Board of Health a law was enacted, June 15, 1874, entitled "An Act to Secure Effective Vaccination in the City of New York and the Collection of Pure Vaccine Lymph or Virus." Under this law a permanent corps of vaccinators was appointed and authority was granted to collect vaccine lymph and to sell the surplus. Lymph was then taken only from a primary vaccination vesicle of a child a few months old, and was collected only on the eighth day. Dr. James B. Taylor, in his report contained in the fifth and sixth annual reports of the Board of Health, states that the vaccine virus at that time in use was of the same stock as that with which the Health Department had been formerly supplied by the Eastern Dispensary, and that this stock was originally obtained from England by Dr. Loines.

Previous to this, during the year 1871, the Health Department had begun the production of bovine virus, but as the virus so obtained proved quite expensive, and as the results were not as satisfactory as expected, its use was abandoned after a few months' trial and the humanized lymph again used.

In the summer of 1876, a second attempt was made to manufacture bovine virus. Dr. James B. Taylor, acting under the directions of the Health Department, started a vaccine farm at Lake View, New Jersey. This farm was continued at that place for only three months and then moved to Clifton, New Jersey, and the immediate supervision given to Dr. E. L. Pardee. There was no further change in the site of the farm till October, 1884, when it was moved to No. 300 Mott street, New York City, where it remained until December, 1887. In the summer months of these twelve years calves were occasionally vaccinated at Cos Cob, Conn., when it was for any reason difficult to obtain calves at Clifton. In December, 1887, the station was moved to No. 916 Second avenue, where it remained till March 1, 1890, when it was again transferred to No. 326 East Forty-fourth street, its present location.

The first bovine virus produced was used at the same time with the humanized virus, and a careful comparison of the two was made, with the result that within a year from the establishment of the farm at Lake View all the virus issued by the Department was animal.

Early in 1895, the Vaccine Laboratory was transferred to the Division f Pathology, Bacteriology and Disinfection, and a detailed investigation ito all the processes of production and preservation of the virus was nmediately begun, and has been continued to the present time. The hoice and care of animals, the places, methods and virus most suitable or inoculation, the times and methods of collection and the preparation nd preservation of virus atter collection, have all been studied. In addiion, the most notable vaccine laboratories in Europe and this country ave been visited and their practice noted. In consequence of this study umerous changes have been made, the most notable of which is the ntire change in the form of vaccine issued and recommended for use.

Formerly the virus used was the serum which issued from the base of vaccine pock formed on the back of an adult animal. This was received nd dried on quills or ivory points. To determine the most active part f a vaccine vesicle the following experiment was made: Typical vesicles vere chosen, and the crust, the underlying pulp and base, and the serum xuding after the former were removed, were collected separately. Each vas mixed with glycerin in the proportion of sixty per cent. raw material nd forty per cent. glycerin, then comminuted in a mortar, and the roducts used in multiple vaccination on children. The pulp showed by ar the best, the crust the next, and the serum the poorest results, as letermined by the percentage of successful vaccinations. Other similar xperiments confirmed this result, and it was concluded that the largest roportion of the active virus is contained in the pulp. The virus now ssued is, therefore, in the form of a glycerinated vaccine pulp. The unction of the glycerin is to make a homogeneous mixture and to act as harmless antiseptic against germs accidentally introduced.

Though led by its own investigations to the adoption of this liquid irus, the Health Department, in supplying this form of vaccine, is only ollowing the example of all the best German, French and English vaccine aboratories ; it is believed, however, that no other virus is tested before ssue as fully as that prepared by this Laboratory.

The present method of production and preservation of the virus is as llows : A red heifer calf about two months old, in good flesh and health, placed upon a bench in a special operating room and strapped on its de with one hind leg fastened vertically against the back of the bench. he area between the thighs, covering about ten inches square and includg the teats, is shaved and washed with soap and water, with hydrogen roxide solution, and finally with sterilized water and then dried with erilized absorbent cotton. On the area so prepared, one hundred spots e then scarified, each from a quarter to half an inch square. The blood washed away with sterilized water, and when the bleeding has entirely ased virus is rubbed on each spot very thoroughly for some minutes ; e calf is then returned to its stall. It is examined on the third and llowing days, and when the vesicles are seen to be at the proper stage development, which is usually on the sixth day, the calf is again placed pon the bench and the whole shaved area washed twice with sterilized ater and once again with peroxide of hydrogen solution. All macrocopic dirt and crust is removed and every scarification is cleansed as horoughly as possible ; then with a sterilized curette each scarification is scraped and every particle of pulp removed into a sterilized glass dish The pulp taken is weighed, comminuted, and mixed with a measured amount of chemically pure glycerin, by being passed between glass rollers on which the glycerin flows. There is thus produced a brown syrupy homogeneous emulsion, which is then drawn by a filter pump into sterilized glass tubes, which when full are sealed in the flame at both ends Each of these tubes holds about 20 cubic centimeters. Capillary tubes of the mixture are prepared at the same time. The greatest precautions are taken to insure cleanliness in the production and preservation of the virus. All instruments and receptacles are sterilized, and the operations of inoculation and collection are made as nearly aseptic as possible.

Before the virus from any animal is used, first, the animal is sent to autopsy and its organs are examined by a veterinarian for any evidences of disease; second, two samples of the virus are given, one to the bacteriologist and the other to the medical tester of virus, and no virus is issued unless the reports of the pathologist, bacteriologist and clinical tester are all satisfactory. The clinical test consists in the inoculation of the virus by scarification, in three places on each of five children who have never been previously vaccinated. There is thus a case test of five and an insertion test of fifteen points, and unless the virus gives one hundred per cent. success in each, that is, unless there are fifteen vesicles formed as a result of the insertion, the virus is not used.

When there is need for virus, the contents of a large tube are forced into a sterilized burette and from that drawn off in measured amounts into small sterilized vials, of which there are two sizes, one containing one-fifth of a cubic centimeter for ten vaccinations, and the other one cubic centimeter for fifty vaccinations. These vials are corked with sterilized rubber stoppers. If capillary tubes are needed, the virus is allowed to flow into a sterilized glass box, which is closed by a glass cover pierced by a hole which just admits a capillary tube. One tube after another is then passed through this opening into the virus and sufficient virus drawn into each tube for one vaccination.

The beginning of the past year was marked by the discontinuance of the use of adult animals as vaccine producers, and the end of the year by the entire discontinuance of the issue of serum vaccine with its carriers, the quill or ivory slip.

Improvements which were frequently only slight modifications of technique (such as the substitution of excelsior for straw bedding) have constantly been made, but the net result of all is that while at the beginning of the year half of the calves vaccinated did not yield a satisfactory product, now it is possible to say that for six months there has been no failure in a calf vaccinated. Moreover, during the past six months not one of the calves which has been vaccinated in the routine way has failed to give a virus yielding one hundred per cent. of success, and this virus tested once a month has continued to yield the same percentage of success in all cases for at least three months, and in most cases for the full six months. Sufficient virus was not put aside to maintain the monthly test during the early part of the year, so that it is impossible to say how long the virus then produced maintained its activity, but some virus has given a satisfactory test eleven months after collection. Successive improvements in the technique have also made it possible to collect more virus from the individual animal, and in that way to diminish the cost of the virus, until at present the cost of sufficient vaccine matter for a single vaccination is one-half that of the cost of a single quill slip in December, 1895.

The clinical results of the virus have been no less satisfactory. Since September 1, when the vaccinators of the Department began their work, there has not been brought to the knowledge of the laboratory a single case of failure of a primary vaccination, and more than fifteen hundred reports have been received.

The following notes on details of routine show some of the reasons which have led to the adoption of the present practice:

Age of Animals Chosen.

Among the first 150 calves there were 2 calves, 4 weeks old; 22, 6 weeks; 60, 2 months; 10, 2½ months; 3, 3 months; 2, 3½ months; 20, 4 months; 25, 5 months; 1, 5½ months; 1, 6 months; 1, 10 months; 2, 12 months, and 1, 18 months. It was found by examination of the vesicles in the older animals in this series—that is, those beyond six months of age—as well as in those formerly used which were two to four years old, that the eruption produced in them by the inoculation of good virus does not resemble closely that produced on the arm of a child, except possibly when the inoculation is made on the thin, delicate and comparatively inaccessible portions of the skin. On the accessible skin, scorifications are promptly covered by a thick, hard hæmorrhagic crust, which frequently cracks and bleeds with the motions of the animal, and almost entirely conceals from view the processes going on beneath. Occasionally around the margins small vesicles may be seen. These, however, are not uniformly present, and when they appear are poorly developed, probably on account of the resisting character of the skin. The development of the vesicle in all its finer changes cannot therefore be watched satisfactorily. On the younger animals, on the contrary, when inoculated on the soft skin, which is in them perfectly accessible, a typical vesicle is produced, which is in many cases almost exactly like that on the arm of a baby.

Between the ages of six months and four weeks, the latter being that of the youngest calves obtainable, the choice is rather one of expediency. Very young calves are found to be hard to feed, delicate, and in some cases very powerfully affected by the vaccine disease. The older animals, on the other hand, are too large for easy handling. The age best adapted for the purpose, therefore, is from two to three months. At this time the calves take milk well, are not too large to be easily handled, and are usually sufficiently well developed to maintain their strength and vigor during the confinement necessary after inoculation.

Sex.

Heifer calves are chosen because with them the inoculated areas can be kept much cleaner than with bull calves.

Place of Inoculation.

There is hardly a spot on the skin behind the shoulders except on the tail, the outside of the thigh and below the hock joints, which has not been used for inoculation, and used successfully. It has been noted, however, that calves vaccinated over the whole of one side and between the legs often show more severe constitutional symptoms than those vaccinated over a smaller area, and that a larger amount of vaccine lymph may be collected from a small area covered with well developed vesicles than from a much larger area on which the vesicles are not so well developed. It has been further noted that the inoculations on the side are more apt to be rubbed than those between the legs; that as a consequence, in the former places, the crust is torn off and the inoculated areas become infected. Moreover, the skin on the upper part of the side and on the back is thicker and denser, vesicles extend less in circumference, are flatter, and contain less pulp.

The place chosen for inoculation, therefore, is an area extending over the posterior portion of the abdomen, between the thighs and extending a short distance down on the inner surface of each thigh.

Care of the Animals.

The condition of the animal has been found to have marked effect on the quality of the virus produced. The cleaner the animal, the less is the danger that the vesicles will become purulent. At present, before a calf is taken into the stable, it is examined carefully with reference to its general development and weight, and especially with reference to its skin. There must be no eruption of any sort, the skin must be quite unwounded, and the area to be used for inoculation must be vascular. After the animal is admitted the veterinary surgeon examines its general health. If his report is unfavorable the animal is excluded. Before inoculation it has no especial care, except that it is cleaned if dirty and after that is kept clean ; it is placed in a roomy stall and allowed some freedom of movement. After inoculation it is put into another stall, which has been cleansed with hot water and sublimate solution, and is there kept confined. Extra pains are taken during the week of this confinement to keep the animal clean. As soon as the virus has been collected the animal is sent away for autopsy. During the stay in the stable the calf is given as much milk as it will take, up to ten quarts a day. The milk is kept on ice, a suitable amount taken out before each of the three feedings, warmed and placed either in an absolutely clean agateware pan before the calf, or in a clean metal calf-feeder, provided with a rubber teat. If the calf does not take all the milk in about fifteen minutes what is left is thrown away, and the calf is then watered with cool boiled water from a clean pail. The temperature is taken once daily and noted on form fastened for that purpose on the side of the stall, and there is noted at the same time the condition of the bowels and the amount of milk the calf has taken in the previous twenty-four hours.

Clinical History.

At the first inspection of the inoculated areas, on the third day, there may be nothing at all apparent except the dried crusts which are formed over the scarified areas. These are dry, thin, brown sero-hæmorrhagic, flat crusts, not elevated and not sensitive, and the skin between these areas is absolutely normal. Sometimes, on this third day, and if not then, usually on the fourth, some few of the areas show minute red discrete papules of the size of a pin point, usually only just palpable ; these are situated at the margin of the crust above mentioned. The following day, that is, either the fourth or the fifth day, there are more of these papules ; those which were before apparent have become larger, confluent in spots and easily palpable. They are then regularly flattened at their summits, which, in some cases, may show a slight pearliness or gray color ; the next day, the fifth or sixth from inoculation, there is usually a well-defined elevated pearly margin around every scarification. The original scarification crust is slightly below the level of the elevated margin ; outside the margin there is a narrow red line, from one-sixteenth to one-eighth of an inch in width. Here and there, entirely outside the scarifications, discrete typical vesicles may be seen, of a size varying from that of a split pea to that of a bean. These vesicles may even on this day show a slight dimpling at their apices. Each is surrounded by a narrow red line. The following day there are no new appearances, but the pearly margin is more elevated and broader, and the scarified area within may be perceptibly raised above the general level. This area may also, especially if the original hæmorrhagic crust has fallen, show some vesicles or even a confluent mass of vesicles, within its bounds. If the virus is not collected on this day, the next day the pearly color becomes more opaque, and on the following day the elevations are less, and a process of drying up begins. The interval between inoculation and the proper time for collection varies. Good virus has been collected at all times between 70 and 166 hours after inoculation ; the interval is longer with old animals than with young, and in winter than in summer. In calves two months old vesicles usually mature in six days. In some cases there is a notable difference in the appearance produced in even six to eight hours. In some calves, as in some children, vesicles take an unexplainedly long time to develop.

In connection with the tests of virus, one of us (Fielder) has made a series of clinical observations on the variations in the normal course of primary vaccination in children, on certain complications attending vaccination in improperly cared-for children, on immunity, on the scars following vaccination, and on the best methods for vaccinating children.

The following variations in the normal course have been noted :

Early and Delayed Vesiculation—The usual time for the first appearance of the vesicle is the latter part of the third or the begining of the fourth day after inoculation. Rather rarely it appears simultaneously with the papule on the second day. Much more commonly vesiculation is delayed until the sixth, seventh or even the eighth day, the subsequent history of the case being typical. During the past year three cases have been observed by the vaccinators of the Department, in which there was no appearance of vesiculation on the eighth day, and the cases were supposed to be failures ; and yet ten days to two weeks later a typical vesicle developed, which ran the usual course, and left a typical scar. One of the cases mentioned was one of five test cases inoculated with a particular virus. The other four took well and ran through the customary course, while the fifth met with the delay above stated.

Areola and Constitutional Symptoms—The most notable variations that may be said to come fairly within the limits of a normal course are observed in the amount of areolar inflammation, and in the intensity of the constitutional symptoms. Occasionally there is almost no areola, and the constitutional disturbance is practically absent. A broad, discolored areola is usually, though not lways, accompanied by severe constitutional symptoms. Finally it is observed that these constitu-onal symptoms are sometimes intense out of all proportion to the amount of local inflammation.

Raspberry Excresence and its Protective Power—Not infrequently when virus of a low grade f activity has been used, no vesicles develop; but there appears, instead, a hard elevated xcrescence, grossly resembling keloid, and in color like a fully ripe red raspberry. This elevaion is not sensitive, no areola develops, no constitutional symptoms appear, and there is no evoluion beyond that of the excrescence itself. This persists for some time, but is finally absorbed and isappears entirely, leaving no scar. The significance of this keloid and its protective value are isputed points. Some consider it an abortive "take," and claim for it some slight protective ower, while others maintain that it affords no protection whatever. A certain number of such ases have been revaccinated as soon as the raspberry has been formed. In most of these this econd vaccination has been successful. Sometimes typical vesicles have resulted, but more often he cases have followed the course of a secondary vaccination instead of the typical course expected ı true primary cases. In a few instances repeated attempts to vaccinate have failed entirely, hough virus was used which had resulted typically in all other cases tried. From these facts the ıference is drawn that, in some cases, the raspberry excrescence does afford a slight degree of nmunity, at least against immediate revaccination. Occasionally raspberry marks and typical esicles develop side by side, and sometimes a vesicle develops on a raspberry base; but in the ıtter case the vesicle usually runs an abortive course.

Abortive Course—In this the vesicle appears early and never reaches full development; pustuıtion takes place correspondingly early, and the whole appearance dries up before the end of the econd week. This course is normal though not invariable, for all vaccinations after the first, and hen this course follows a supposed primary vaccination, careful questioning usually elicits the ıct that vaccination has been attempted before, but was supposed to have been a complete failure. Vhen the arm is closely examined, the scar of the previous attempt appears as a mark no more istinct, perhaps, than might have been expected from the scarification itself.

Modifying Effects of General Ill Health, Hot Weather and Diarrhea.

Marantic and poorly nourished babies often respond atypically or not at all to a virus which ives a perfect result in healthy children.

It is asserted that vaccination often fails when performed in hot weather, or upon children ıffering from diarrhea. Many children have been vaccinated by the Department vaccinators on ctremely hot summer days. Some had diarrhea at the time of inoculation, and some developed during the evolution of the vaccine, but neither the heat nor the diarrhea had apparently any fluence in preventing the development of typical vesicles. When the weather was hottest, hower, the vesicles would sometimes appear a day or two earlier than usual, and the whole course of e vaccination would be slightly accelerated.

Immunity—Occasionally a primary case runs an abortive course similar to that common in condary cases. If the virus used is of unimpeachable quality, and if there exist no conditions, ch as impaired general health, or skin disease, which might possibly modify the course of the ccination, such cases are supposed to be examples of partial immunity. In the experience of e vaccinators of this Department, who have in some cases had an experience lasting over tens of ars and embracing several hundred thousand vaccinations, instances of absolute immunity ainst vaccination are extremely rare. There is no doubt that children differ greatly in their sceptibility to vaccine infection, but a first class virus, carefully and skillfully inoculated, almost ver fails.

Duration of Immunity—Several observations have been made on the interval which must ıpse after a primary vaccination before a successful revaccination becomes possible. This inter-l varies greatly with different persons, but it has been made evident that it may be as short a ne as six months. Moreover it has been shown that at least seventy-five per cent. of the children ıder ten years of age in the public schools are susceptible to revaccination.

Dr. Fielder has also made the following note on certain rare complications seen mainly in ıproperly cared for children.

Cellulitis—The most frequent complication seen is a localized septic infection. This, when vere, is usually introduced after vaccination into the open wound made by the operation. It may : of any grade of severity, from the moderate degree of redness of the skin and subcutaneous duration around the suppurating vesicle, which constitutes the so-called "areola" in a normal ıse vaccination, up to the most aggravated form of gangrenous cellulitis, with suppuration of the ljacent lymphnodes, and constitutional symptoms of septicemia. Fortunately, very few cases ıss beyond the stage of a moderate cellulitis with some sloughing at the site of the central vesicle, ıd a more or less marked nonsuppurative axillary (or inguinal) adenitis. Such cases demand, ıd usually respond kindly, to treatment upon general surgical principles.

Erysipelas—Erysipelas is said to be a fairly frequent complication. The dividing line between ıis disease and cellulitis is a very indefinite one, both bacteriologically and clinically, and it is ›metimes difficult to decide whether a particular case is one of erysipelas or of local dermatitis and cellulitis due to ordinary streptoeoccus infection. The classical distinctive features of erysipelas are as follows: The inflammation extends widely and rapidly, and is most intense at its spreading edge. Vesicles form on the surface of the affected skin. Resolution takes place first at the point first attacked, and is attended by considerable desquamation. If only such classical symptoms be regarded as erysipelas, instances of the disease following vaccination must be extremely rare. None have been observed. The brilliant blush upon the skin, which is seen in many cases of infected vaccination insertions, frequently suggests erysipelas, but in these cases the inflammation does not spread very rapidly nor very widely. It almost never goes beyond the affected limb. It is most intense in the immediate vicinity of the vesicle, and continues to be most intense there. Vesicles do not form upon the skin, except, perhaps, a few in the immediate vicinity of the vaccinated spot. Resolution takes place first at the periphery of the inflamed area, and last at the point first attacked, and is not attended by desquamation.

Eruptions on the Skin—Next in frequency to the local infections and their attendant constitutional disturbances come the various rashes which occasionally appear during the evolution of the vaccine vesicle. They usually develop about the time the areola makes its appearance, but may come earlier. The eruption most frequently observed has taken the form of roseolous patches, small and large, distributed over most of the body. In some cases these seemed entirely non-inflammatory, and were attended by little or no itching or constitutional disturbances. In other cases itching was severe. In either event these rashes faded in from two to four days without treatment. In a few cases observed the eruption appeared to be a type of erythema multiforme. There was more or less general distribution of erythematous patches one-quarter to three-quarter inch in diameter, with a small vesicle in the centre of each patch. There was considerable itching, the vesicle was soon destroyed by scratching, and a bloody crust formed which speedily dried up, and the patch faded, leaving a faint pigmentation which persisted for some time. In these cases there were moderate constitutional symptoms. Impetigo contagiosa occurs as a complication. Two cases recently observed were well developed on the sixth day after vaccination. In one, a lesion of impetigo appeared to be situated at the side of each of the three vaccine vesicles, and there was a patch of the disease upon the back of the infant's neck. In the other infant the eruption occupied the lower part of the back. In both cases constitutional symptoms were insignificant. In no other cases vaccinated with this virus did impetigo appear. True vaccinia, or a general eruption of vaccine vesicles, has not been observed. Not infrequently one or two extra vesicles develop in the immediate vicinity of the original one, but their presence is easily explained upon the theory of auto-inoculation, and no case has been seen in which auto-inoculation as a cause could be excluded. Three cases are described in which unmistakable vaccine vesicles appeared in other parts of the body after vaccination. In one case, two vesicles appeared side by side, just above the wrist of the vaccinated arm. The child had gotten some of the blood and pulp mixture upon her right hand, and had rubbed it upon her left wrist. The mother had wiped the wrist with a cloth, but had not washed it. The extra vesicles were as far advanced when inspected as the original ones. This was an unquestionable case of auto-inoculation. In the second case, four vesicles appeared, one on the left forearm (the vaccination being on the left upper arm), one on the right forearm, one on the right upper arm, and one on the left thigh. This was the seventh or eighth day after vaccination, when the original vesicle was already well developed and surrounded by an areola. The new vesicles were soon broken by scratching, and their progress could not therefore be accurately followed, but they appeared to run the short course of a secondary vaccination. No positive history of auto-inoculation could be obtained in this case, but as from the position of the vesicles the child could easily have infected himself without the knowledge of his parents, there was no reason for postulating a systematic infection. The third case was clearly an auto-inoculation. The child scratched its arm and rubbed the fingers in its eye. As a result, there developed three vesicles, one on the upper lid and two on the lower, just where their edges came together in closing the eye.

Classification—Of fourteen observed cases of skin eruption, nine were roseola, three erythema multiforme, and two impetigo contagiosa.

Delayed Healing after the Scab is Shed—In some cases where infection has taken place, an indolent ulcer follows the shedding of the scab, or the spot is covered with flabby, exuberant granulations. Some of these cases, when not treated, have remained unhealed for months. In others, the spot has apparently healed, but the resulting cicatrix was of such low vitality that it broke down repeatedly. Such cases have continued for months, alternately healing and breaking down.

The Scar—For a number of months the normal scar is red and is usually depressed. Gradually it loses its color and contracts somewhat. Its final appearance, in typical cases, is as follows: The color is whiter than the surrounding skin, the shape is quite regular, the edges harply defined and the entire area is slightly depressed. The centre is smooth and is surrounded by a more or less deeply and numerously foveated ring. This centre corresponds to the original area of scarification, while the foveated ring represents the area of active vesiculation. Sometimes the scar is poorly marked even where the original vaccination has run a well marked and perfectly typical course. There is no depression, the appearance of a foveated ring with a smooth centre is absent and a smooth surface appears instead. This may be covered more or less thickly with tiny dots, which, when examined with a lens, prove to be very minute foveations.

One hundred and thirty-two vaccination scars in thirty-four children were inspected between five and six months after vaccination. The vaccinations were performed by quadruple puncture with a lancet during the months of November and December, 1895, and the inspection took place during May, 1896. The result is shown in the following table:

		Number.	Per Cent.
Diameter of scar	⅛ inch and less	47	25.6
	3/16 inch	48	36.3
	¼ inch and more (2 cases)	37	28.
		132	
Character of scar: As to 1. Sharpness of definition; 2. Depression	Poor	37	28.
	Fair	60	45.5
	Good	35	26.5
		132	
Foveations	None	44	33.3
	Slight	46	35.
	Fair	26	19.7
	Good	16	12.1
		132	

An examination of this table shows a large percentage of poor or only fair scars, both as to their general character and as to foveations. Inasmuch as every one of these cases ran a typical and well-marked course, the question arises whether the usual assertion is correct, viz., that the efficiency of a vaccination is fairly indicated by the so-called "quality" of the resulting scar, as shown by its size, clearness of outline, depression and foveations.

Methods of Vaccination—To determine the best methods of vaccinating children, parallel series of test vaccinations were made. In one the virus was introduced by scarification, in the other by puncture. With the former method the virus was rubbed on an area of about three-eighths of an inch square, which had been scarified with a cambric needle. With the latter a drop of virus was placed on the tip of a lancet, which was inserted obliquely under the skin.

Results of tests made with a weak virus show that the puncture test is the more exacting one; this would also seem theoretically probable, for if the virus were not particularly rich it might be possible to introduce either no germs at all or very few germs into the minute puncture, and in either case no vesicle might result. Again, if from some lack of dexterity a rich virus were not carried freely into the puncture on the lancet, there might be no vesicle formed. On the other hand, with the scarification more virus is rubbed on the spot, and some virus is more surely brought into immediate connection with an exposed area. It also appears, however, that when the scarified area is large there is a much greater chance of infection; it has been observed that when inoculation by puncture is used post vaccinal infection practically never occurs, and the vaccine vesicles are typical. The greater safety of the puncture method, and the greater certainty of success of the scarification method, can be combined by making the scarified area small, that is, not more than three-eighths of an inch on the side. This method of scarification of small areas has therefore been adopted for use by the Department vaccinators.

Comparison was also made between two series of vaccinations, in one of which the virus was simply smeared on, while in the other it was thoroughly rubbed in. The result showed, as was expected, that simple smearing is unreliable, and a thorough rubbing in is to be recommended.

Bacteriological Examination—The general result of bacteriological examination of specimens submitted is that there are nearly always many bacteria, cocci and bacilli present in the vaccine emulsion during the first few days after collection and preparation, but that those present are probably mainly air bacteria, which die rapidly or are killed by glycerin, and that in four weeks the vaccine is nearly though not always quite sterile. There are occasionally found special bacteria which persist in the vaccine emulsion for several months, but these do not appear to have any pathogenic power.

Respectfully submitted,
JOHN H. HUDDLESTON, M. D.,
Medical Inspector in Charge.
F. S. FIELDER, M. D.,
Medical Inspector.

REPORT ON DANGER OF INFECTION THROUGH EXPECTORATION IN PUBLIC PLACES.

NEW YORK, January 14, 1896.

Hon. CHARLES G. WILSON,
President:

SIR—We desire to direct your attention anew to the continual transmission of infectious disease in public places through the expectoration of persons suffering with different forms of infectious diseases of the throat and lungs.

It has been for a long time well known that the expectoration of persons suffering from laryngeal or pulmonary tuberculosis (consumption), pneumonia, influenza or la grippe, and from diphtheria, contains the specific germs of these different diseases, and is capable of inducing these diseases in others. There is, furthermore, much evidence that a similar condition exists in certain more readily communicable diseases, such as scarlet fever, measles and whooping-cough.

In regard to some of these affections, the danger from the expectoration in public places is, of course, small, as the patients are ordinarily confined to their homes during the infectious period. But this is not universally the case. It has long since been shown that the chief means for the transmission of consumption is the dried and pulverized sputum of persons suffering from this disease. Such sputum may contain enormous numbers of living and virulent tubercle bacilli. Consumptives are often able to pursue their usual avocations for many years, and during all of this period the expectoration may contain the tubercle bacilli in large numbers.

It has been shown, with reference to diphtheria, that mild cases are frequently not recognized, are not regarded as diphtheria, while the diphtheria bacilli present in the throat secretion may, should they be transmitted, produce as virulent diphtheria in other persons as the bacilli from the severest types of the disease. These mild cases are often not confined to their homes at any period of the affection. Also during convalescense from more severe attacks, often for several weeks, the throat secretions may contain virulent diphtheria bacilli.

Again, in influenza, which, at several periods during the last few years, has been a source of great suffering and has led to a large mortality in this and other cities of this country, it has been conclusively shown that the expectoration ordinarily contains the influenza bacillus, and it is probable that the disease, as is the case with certain other infectious diseases, is largely communicated from person to person through the dried expectoration floating as dust in the air.

Occasionally, too, we find in health, or after convalescence from pneumonia, that the expectoration of apparently well persons contains the germs which cause pneumonia—pneumococci—and there is a large amount of evidence that this disease, which is, undoubtedly, under certain conditions, communicable, is spread to no inconsiderable extent through the agency of such germ-laden expectoration.

The studies of the past years have shown that there are certain germs in the mouths and throats of many persons suffering from catarrhal affections which, while not ordinarily dangerous, may become so when they gain entrance through contaminated dust to the respiratory organs of susceptible persons.

It is not necessary, we believe, to refer in detail to the possible dangers connected with the expectoration in other infectious diseases. Enough has been said to indicate clearly the risks to which all persons are subjected who ride in public conveyances in this city or who are exposed in other public places to an atmosphere contaminated with dust arising from mats, floors, etc., soiled by sputum. The floors and platforms of the street cars and of the elevated cars, and particularly the stairs of the elevated road stations and the platforms and floors of the stations themselves, are constantly being soiled by expectoration. This dries and pulverizes (the fibre mats of the elevated cars especially favor these processes) and shortly floats in the air as dust. Thus the passengers and occupants of these conveyances and stations are constantly more or less exposed to the germs of infectious disease through the breathing of this dust.

Another grave feature of this pollution of public places of assembly and public conveyance is the inevitable transportation of this always objectionable and frequently dangerous material on the footwear and on the clothing, and particularly the skirts of women, into private houses, where, in the absence of the most perfect system of ventilation and cleaning, it is a constant menace to the welfare of the occupants, whose attempts to maintain salubrious conditions in their homes are rendered, in an important particular, futile, through the vicious practices of others in public places.

Aside from these real and, as we believe, important dangers from a sanitary standpoint, the filthy habit of spitting in such public places and conveyances is frequently an intolerable nuisance and should not be permitted in a well regulated and intelligently governed community. This should be abated, as is any other public nuisance which is brought to the attention of this Department. That it is simply a habit, and not a necessity, is clearly shown by the large number of men who are free from it and the insignificant proportion of women who practice it. There seems to be no good reason for the longer sufferance by the mass of people of the carelessness and negligence of the few. We believe that this is a matter of great importance and that, on this ground alone, it demands the interference of your Board. We are aware that this subject has frequently engaged the attention of your Board, and that action has been delayed because of certain difficulties inherent in the problem, but we believe that the time has now arrived when the people of the City of New York will heartily support the adoption of such sanitary regulations as may seem necessary and expedient for the abatement of this widespread nuisance and source of danger. In Paris the authorities have caused to be placed in public conveyances a notice, which is signed by the Prefect of Police, cautioning people against expectoration upon the floor. Notices, with similar intent, have been posted in public conveyances in Belfast, Scotland, in Philadelphia and in other places.

In view of all these facts, we would recommend to the consideration of your Honorable Board the following preamble and resolution:

Whereas, It is a common practice to expectorate on the floors or on the mats in various public conveyances of this city, and upon the stairs, floors and platforms of the stations of the elevated roads, and upon the floors of halls and rooms in public buildings; and

Whereas, It has been conclusively shown that in several forms of infectious diseases, the expectoration is a means of transmission of the disease, and when coming from persons suffering from such diseases, who are able to go about in public places, is a distinct and frequent source of danger; and

Whereas, This diffusion of dangerous and infectious material is the result of carelessness and negligence, and is unnecessary and is a public nuisance; therefore, be it

Resolved, That notices be posted in all public places and in the halls and assembly rooms of all municipal and federal buildings, and in all surface and elevated cars in this city, signed by the Board of Health, warning passengers against expectoration upon the floors of such places, and, further, that similar notices be posted in the stations of the elevated roads warning against expectoration upon the platforms and stairs or on the floors of such stations.

Resolved, That the municipal authorities be requested to provide sufficient and proper receptacles for expectoration for such public places as are in their control, and that the managers of the roads be required to provide similar receptacles sufficient in number for their stations and platforms, and that in all cases these receptacles be kept in a cleanly condition.

Resolved, That the officers of the Manhattan Elevated Road be requested to give peremptory orders to their guards to refrain from and to prevent, so far as is possible, expectoration from the trains into the streets, and that the officers of all railroads and the officers in charge of all public buildings in this city be requested to secure the enforcement of the above regulation.

Respectfully submitted,

HERMANN M. BIGGS,
T. MITCHELL PRUDDEN.

REPORT ON THE DISTRIBUTION OF TUBERCULOSIS IN NEW YORK CITY.

To the Pathologist and Director of the Bacteriological Laboratories:

SIR—I have the honor to report herewith the results of an investigation made to determine the distribution of tuberculosis in the New York City, with the object of demonstrating, by statistical tables and maps, that consumption is unquestionably an infectious disease, as proved by its grouping, like other infectious diseases, in this city; that it is not generally diffused, but confined to narrow limits, chiefly in the old and densely populated parts of the city; that in consequenee of its distribution, and the fact that it is a germ disease, there is good reason to believe that the necessary sanitary measures will prevent its diffusion and lower the death-rate; and that these observations are fully confirmed by the experience of others, both in this country and in Europe.

Attention is first directed to Table 1, Fourth Ward, which gives the streets, number of houses and number of cases of tuberculosis reported in these houses, and cases per house, during the last three years. The following is a summary of this table:

Number of streets in which cases occurred		21
Number of houses in which cases occurred		248
Number of cases in 1894	173	
Number of cases in 1895	161	
Number of cases in 1896	207	
Total number of cases in three years		541
Average number of cases per house		2.81

According to the census of 1896, there are 663 inhabited houses in the Fourth Ward with a population of 18,323, or an average number of 27.6 persons per house.

The following tables have been prepared to show the distribution of tuberculosis in this ward:

Total number of inhabited houses in the Fourth Ward	663
Number of houses infected	248
Percentage of houses infected	37.3
Total number of houses	663
Total number of cases	541
Cases per house in the Fourth Ward	0.81

Population in the Fourth Ward	18,323
Cases per 1,000 in 1894	9.4
Cases per 1,000 in 1895	8.7
Cases per 1,000 in 1896	11.2
Total cases per 1,000 in three years	29.3

TABLE I.—WARD IV.

Streets—Number of Houses and Cases of Tuberculosis, and cases per house, 1894–1897.

STREET.	HOUSES.	1894.	1895.	1896–97.	TOTAL.	CASES PER HOUSE.
Chatham street	4	10	5	5	20	5.
Chatham Square	5	2	9	..	11	2.2
William street	7	3	3	6	12	1.7
Rose street	4	3	..	4	7	1.7
Madison street	17	12	12	15	39	2.3
Gold street	1	1	..	..	1	1.
Vandewater street	3	2	1	..	3	1.
Pearl street	19	17	20	20	57	3.
New Bowery	3	2	2	1	5	1.6
South street	8	5	3	5	13	1.6
Water street	20	8	9	16	33	1.6
Cherry street	43	26	25	44	95	2.2
New Chambers street	10	9	8	11	28	2.8
Roosevelt street	32	18	12	37	67	2.1
Oak street	13	8	16	9	33	2.5
James Slip	2	2	1	3	6	3.
James street	19	13	15	11	39	2.
Catharine street	7	5	3	2	10	1.4
Oliver street	28	24	10	17	51	1.8
Henry street	2	1	1	1	3	1.5
Batavia street	1	2	6	..	8	8.
21 streets	248	173	161	207	541	2.18

In a total number of 663 dwillings, with a population of 18,323, or 27.6 persons per house, 248 houses, or 37.3 per cent., were infected with tuberculosis. In the 248 houses there were 541 cases in three years (2.18 cases per house), 173 cases in 1894, 161 cases in 1895 and 207 cases in 1896–97. The average number of cases to the house for the whole ward (663 houses) was 0.81.

The cases given in these tables include deaths as well as reported living cases of tuberculosis. The list, however, is not complete, as there was no compulsory return of cases, and only a small proportion, doubtless, of the actual number were returned. The increase in the number of c in 1896 is probably only apparent, as the returns were more prom made during this than the two previous years. But it is evident tha the three years—1894 to 1896, inclusive—only a small proportion of houses, viz., 37.3 per cent. of the total number in the ward were infec It is also seen that some streets have a greater number of infe houses and cases than others, and that this remains so year after year

Table II., Ward IV., gives the streets, house numbers and house which three or more cases of tuberculosis have been reported in on more years during the last three years. The following is a summar this table:

Number of streets in which cases occurred	
Number ot houses in which three or more cases occurred	
Number of cases in 1894	88
Number of cases in 1895	95
Number of cases in 1896	119
Total cases in these houses in three years	
Average number of case per house	

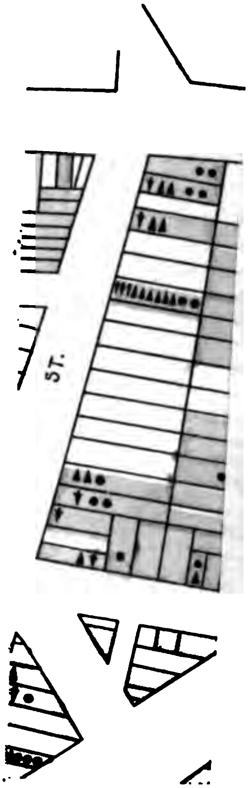
Comparing these figures with those obtained for the whole ward, find:

Total number of infected houses in the ward	2
Number of houses in which three or more cases occurred	
Percentage on total infected houses	
Total number of cases in the ward	5
Cases occurring in 28.2 per cent. of the houses infected	3
Percentage of cases in same	
Total number of inhabited houses	6
Number of houses in which 55.8 per cent. of cases occurred	
Percentage on total houses	

It is seen, therefore, that of the infected houses 28.2 per cent. tained 55.8 per cent. of the cases, and these occurred in only 10.2 cent. of all the houses in the ward.

Many of these houses, as will be seen by referring to the table have had one or more cases every year for three consecutive years, of them having had as many as eight or eleven cases during this pe Several houses, in which one or more cases of tuberculosis have reported in the last three years, have had deaths from the same di in them for eight or nine years, viz., five houses, in which 22 cases been reported since 1893, have had 36 deaths from tuberculosis 1888 to 1893, inclusive. Such houses would seem to be perman infected, as Dr. Tracy remarks (from whose report on tuberculos New York, published in the "City Record," January 11, 1894, figures are taken), and should be thoroughly renovated from to bottom, or, better, condemned and torn down. They are old hous bad sanitary condition, some of them rear tenements, and densely pa with the poorest and filthiest class of people, some of them being as cheap lodging-houses.

The distribution of tuberculosis in these districts is, perhaps, b shown graphically. The accompanying maps are fac-similes of th



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Occupants.
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102
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26
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69
41
97
167
126
87
56
41
15
31
18
71
168
41
125

the office of the Health Department, upon which all cases of tuberculosis have been recorded since 1893. From an examination of these maps, it will be seen that tuberculosis is not uniformly distributed, even in Ward IV., which contains more cases of tuberculosis than any in the city. The bulk of the cases are confined to narrow limits in certain streets and houses. It is also seen, by noting the symbols for each year, that one case is apt to follow another in the same house within a year or two. Often all the houses in a block contain cases, but again, one or more houses in an infected area seemed to have escaped infection.

TABLE II.—WARD IV.

Streets and Houses in which Three or more Cases of Tuberculosis occurred in 1894-1897, *Description of Houses and Number of Occupants.*

STREETS AND HOUSE NO.	CASES OF TUBERCULOSIS.			TOTAL.	DESCRIPTION OF HOUSES.	Number of Occupants.
	1894.	1895.	1896–97.			
173 Chatham street	4	5	2	11	....	..
219 Chatham street	3	..	2	5	....	..
22 Chatham Square	2	1	..	3	....	..
4 Chatham Square	..	3	..	3	....	..
9 Chatham Square	..	3	..	3	....	..
28 Rose street	1	..	2	3	....	..
202 William street	..	2	2	4	....	..
30 Madison street	..	1	2	3	4-story, front	21
28 Madison street	3	1	1	5	4-story, front, and 7-story, rear.	102
36 Madison street	1	1	1	3	4-story, front	12
42 Madison street	2	4	..	6	....	..
64 Madison street	1	1	1	3	5-story, front	46
334 Pearl street	3	..	2	5	5-story, front, and 5-story, rear.	92
336 Pearl street	1	2	1	4	5-story, front	51
404 Pearl street	3	2	3	8		
410 Pearl street	1	..	2	3	5-story, front	36
432 Pearl street	2	..	1	3	5-story, front, and 5-story, rear.	93
434 Pearl street	1	2	..	3	5-story, front, and 5-story, rear.	94
450 Pearl street	2	6	3	11	....	..
456 Pearl street	..	2	1	3	....	..
460 Pearl street	2	2	1	5	....	..
151 South street	1	1	1	3	....	..
197 South street	..	..	3	3	....	..
336 Water street	..	1	2	3	4-story, front	8
341 Water street	..	..	3	3	5-story, front	62
347 Water street	2	..	3	5	5-story, front	15
18 Cherry street	1	1	6	8	5-story, front, and 6-story, rear.	76
20 Cherry street	..	1	3	4	3-story, front, and 3-story, rear.	39
22 Cherry street	3	..	5	8	4-story, front, and 4-story, rear.	92
19 Cherry street	2	..	1	3	4-story, front, and 5-story, rear.	82
27 Cherry street	1	1	2	4	4-story, front	41
29 Cherry street	1	..	2	3	....	..
32 Cherry street	1	3	1	5	4-story, front, and 4-story, rear	138
33 Cherry street	..	2	2	4	4-story, front	31
36 Cherry street	1	2	3	6	5-story, front, and 5-story, rear.	148
39 Cherry street	1	2	..	3	....	..
67 Cherry street	..	..	3	3	4-story, front	26
117 Cherry street	..	2	1	3	....	..
56 New Chambers street	1	1	1	3	5-story, front	29
70 New Chambers street	1	2	3	6	5-story, front	69
73 New Chambers street	3	4	..	7	5-story, front	41
8 Roosevelt street	2	1	..	3	5 and 4-story fronts	97
10 Roosevelt street	..	..	3	3	5-story front, and 4-story, rear..	167
12 Roosevelt street	1	1	1	3	5-story, front	126
27 Roosevelt street	3	..	..	3	5-story, front	87
75 Roosevelt street	1	..	3	4	5-story, front	56
77 Roosevelt street	1	..	2	3	4-story, front	41
91 Roosevelt street	1	3	3	7	3-story, front	15
114 Roosevelt street	2	..	1	3	4-story, front	31
121 Roosevelt street	..	2	4	6	4-story, front	18
7 Oak street	..	3	2	5	5-story front, and 5-story, rear..	71
32 Oak street	3	2	3	8	5-story, front and 4-story, rear..	168
34 Oak street	1	2	..	3	5-story, front	41
35 Oak street	..	4	1	5	5-story, front and rear	125

Streets and House No.	Cases of Tuberculosis.			Total.	Description of Houses.	Number of Occupants.
	1894.	1895.	1896–97.			
15 James slip	2	..	3	5		..
45 James street	1	1	1	3		..
65 James street	1	1	1	3		..
78 James street	1	2	..	3	3-story, front	10
102 James street	1	..	2	3	5-story, front	66
3 James street	2	4	..	6	4-story, front	33
7 James street	1	..	2	3		..
82 Catharine street	1	2	..	3		..
28 Oliver street	3	..	..	3	4-story, front	31
36 Oliver street	1	1	1	3		..
42 Oliver street	1	..	3	4	5-story, front	66
51 Oliver street	1	2	1	4	5-story, front	68
64 Oliver street	1	1	1	3	5-story, front and rear	87
66 Oliver street	3	1	0	3	5-story, front	67
77 Oliver street	1	1	2	4	5-story, front	81
5 Batavia street	1	1	6	8	5-story, front and 4-story, rear.	112
70 Houses	88	95	119	302		

In a total of 248 infected houses (see Table I.) there occurred 302 cases in 70 houses, or 28.2 per cent.—88 cases in 1894, 95 in 1895 and 119 in 1896–1897. Of 541 cases in the ward, 302, or 55.8 per cent occurred in 28 per cent. of the houses, and in 10.5 per cent. of all the houses in Ward IV. (663) there was an average number of 4.3 cases to the house in 28 per cent. of the infected houses.

Some of the infected houses had as many as 8 and 11 cases in the three years. See Nos. 404 and 450 Pearl, No. 173 Chatham, Nos. 18 and 22 Cherry, No. 32 Oak and No. 5 Batavia streets.

The following is a list of houses in which deaths from tuberculosis have occurred almost every year since 1888, taken from Dr. Tracy's report, January 11, 1894. The cases (including deaths) are also given which have been reported in the same houses since that time:

Streets and House No.	Deaths.						Cases (Including Deaths.)		
	1888.	1889.	1890.	1891.	1892.	1893.	1894.	1895.	1896–97.
18 Cherry street	2	1	1	1	1	2	1	1	6
90 Catharine street	1	1	1	1	1	1	1	1	..
5 Batavia street	1	2	2	2	2	1	2	6	..
10 Roosevelt street	..	1	1	1	4	..	..	..	3
9 James street	..	2	..	..	3	..	1	..	..
5 Houses	4	7	5	5	11	4	5	8	9

Table III., Ward VI., shows the following for this ward:

Number of streets in which cases of tuberculosis occurred		19
Number of houses in which cases of tuberculosis occurred		239
Number of cases in 1894	157	
Number of cases in 1895	127	
Number of cases in 1896–1897	191	
Total number of cases in three years		465
Average number of cases per house		1.94

ırding to the last census there are 630 inhabited houses in Ward h a population of 22,897, or an average number of 36.3 persons se. Therefore we have the following distribution of tuberculosis vard :

ıber of inhabited houses in [	630
houses infected	239
: of houses infected	37·9
ber of houses	630
ber of cases	465
ıouse in Ward VI	0.72

Population of Ward VI	22,897
Cases per 1,000 in 1894	6.8
Cases per 1,000 in 1895	5·5
Cases per 1,000 in 1896–97	8.2
Total cases per 1,000 in three years	20.5

ıpears, therefore, that the distribution of tuberculosis in this ward .me as in Ward IV., but there are not as many cases in proportion umber of inhabitants.

TABLE III.—WARD VI.

Streets, Number of Houses and Cases of Tuberculosis in 1894 *to* 1897.

STREETS.	HOUSES.	1894.	1895.	1896–97.	TOTAL.	CASES PER HOUSE.
	8	11	7	5	23	2.9
eet	16	20	6	14	40	2.5
'eet	2	2	1	..	3	1.5
	37	24	22	34	80	2.16
eet	41	19	21	30	70	1.7
t	28	12	22	11	45	1.6
	21	19	8	32	59	3.1
:t	19	11	8	8	27	1.4
t	7	3	6	11	20	2.8
	12	5	3	10	18	1.5
t	7	3	4	2	9	1.3
	21	10	11	13	34	1.6
	2	2	1	..	3	1.5
	3	1	..	2	3	1.
eet	6	3	1	2	6	1.
eet	7	5	3	3	11	1.5
t	3	..	..	3	3	1.
reet	2	1	..	1	2	1.
ıce	8	6	3	10	19	2.3
	239	157	127	191	465	1.94

total of 630 dwellings in Ward VI., with a population of 22,897, persons per house, 465 cases, or 0.72 per house for the whole 'ere reported. These cases occurred in 239 houses, or 37.9 per the number of houses in the ward ; there were 1.94 cases per f the infected houses.

TABLE IV.—WARD VI.

d Houses in which Three or More Cases of Tuberculosis Occurred, 1894–1897.
Description of Houses and Number of Occupants.

TS AND HOUSE NOS.	CASES OF TUBERCULOSIS.			TOTAL.	DESCRIPTION OF HOUSES.	Number of Occupants.
	1894.	1895.	1896–97.			
	1	1	1	3		....
	7	2	1	10		....

STREETS AND HOUSE NOS.	CASES OF TUBERCULOSIS.			TOTAL.	DESCRIPTION OF HOUSES.	Number of Occupants.
	1894.	1895.	1896–97.			
6 Bowery	1	2	1	4	....	....
190 Chatham street	3	4	1	8	....	....
184 Chatham street	3	..	2	5	....	....
128 Chatham street	1	..	2	3	....	....
18 Mott street	..	1	4	5	5-story, front	86
20 Mott street	4	3	..	7	5-story, front and rear	67
15 Mott street	4	2	2	8	5-story, front and rear	120
24 Mott street	1	..	2	3	4-story, front and rear	54
30 Mott street	1	..	2	3	3-story, front	36
26 Mott street	2	..	1	3	4-story, front	37
59 Mott street	3	1	..	4	5-story, front and rear	109
9 Mulberry street	2	5	1	8	5-story, front	98
20 Mulberry street	2	1	..	3	4-story, front and rear	82
26 Mulberry street	1	..	2	3	5-story, front	41
60 Mulberry street	1	1	3	5	6-story, front and rear	139
89 Mulberry street	3	..	..	3	5-story, front and rear	164
91 Mulberry street	..	3	3	6	5-story, front and rear	153
9 Baxter street	1	..	3	4	....	....
40 Baxter street	..	3	..	3	6-story, front, and 5-story rear	85
90 Baxter street	..	3	1	4	5-story, front and rear	144
91 Baxter street	1	1	1	3	5-story, front	98
99½ Baxter street	1	2	..	3	5-story, front	61
85 Bayard street	..	..	3	3	5-story, front	41
89 Bayard street	2	2	..	4	5-story, front	38
10 Pell street	1	..	2	3	....	....
12 Pell street	4	5	6	15	5-story, front (2 houses)	128
11 Pell street	1	1	1	3	5-story, front, and 4-story rear	98
16 Pell street	..	1	3	4	5-story, front	98
22 Pell street	3	..	4	7	6-story, front	112
30 Pell street	2	..	1	3	3-story, front	26
32 Pell street	1	..	2	3	4-story, front and rear	73
4 Doyer street	1	1	2	4	4-story, front	46
17 Doyer street	2	1	5	8	3-story, front	18
37 Park street	..	..	3	3	6-story, front and rear	129
155 Worth street	1	2	..	3	....	....
468 Pearl street	1	2	..	3	....	....
472 Pearl street	1	1	1	3	5-story, front, and 4-story rear	112
484 Pearl street	..	..	4	4	6-story, front	68
148 Leonard street	1	1	1	3	5-story, front	39
19 City Hall place	3	1	..	4	4-story, front and rear	82
36 City Hall place	..	..	3	3	....	....
40 City Hall place	2	1	3	6	....	....
45 houses	72	56	78	206		

Of a total of 239 houses infected with tuberculosis (see Table III.), 206 cases out of 465, or 44.37 per cent., occurred in 19 per cent. (45) of the infected houses and in 7 per cent. of all the houses in the ward (620). Of the 206 cases 72 occurred in 1894, 56 in 1895 and 78 in 1896–97.

In the greater number of houses one or more cases have been reported every year for the last three years, and in some many cases for several consecutive years.

The following is a list of houses in this ward in which deaths from tuberculosis have occurred since 1888, cases, including deaths, being given from 1893 to 1897:

STREETS AND HOUSE NOS.	DEATHS.						CASES, INCLUDING DEATHS.		
	1888.	1889.	1890.	1891.	1892.	1893.	1894.	1895.	1896-97.
102 Bayard street	2	1	1	1	1	..	..	1	..
76 Mulberry street	1	1	1	1	1	..	..	..	1

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ident, therefore, that identically the same conditions exist as
ibution of tuberculosis in these two wards. Wards IV. and VI.

Streets and House Nos.	Deaths.						Cases, Including Deaths.		
	1888.	1889.	1890.	1891.	1892.	1893.	1894.	1895.	1896–97.
o Mulberry street	..	..	..	1	3	..	..	..	1
7 Mott street	..	3	..	2	3	..	..	..	2
Mott street	2	1	2	1	4	..	..	1	4
1 Pell street	7	9	3	1	4	..	1	1	1
o City Hall place	..	..	..	..	4	..	..	..	3
houses	12	15	7	7	20	..	1	3	12

Table IV., Ward VI., shows the following distribution of infected ouses in this ward in which three or more cases have occurred for one r more years during the last three years:

umber of streets in which cases have occurred	13
umber of houses in which three or more cases occurred	45

umber of cases in 1894	72	
umber of cases in 1895	56	
umber of cases in 1896–1897	78	
Total cases in these houses in three years		206
Average number of cases per house		4.5

Comparing these with Table III., we find for the whole of Ward VI.:

otal number of infected houses	239
umber of houses in which three or more cases occurred	45
ercentage on total infected houses	18.9
otal number of cases in the ward	465
ases occurring in 19.9 per cent. of the houses infected	206

Percentage of cases in same	44.3
Total number of inhabited houses	630
Number of houses in which 44.3 per cent. of cases occurred	45
Percentage of total houses	7.0

According to this, in 18.9 per cent. of the infected houses 44.3 per ent. of the cases occurred, and these in only 7 per cent. of all the houses Ward VI.

The map of Ward VI. shows graphically also the same thing as the ap of Ward IV., viz., that tuberculosis is chiefly confined to certain calities and to a small number of houses in these localities. In this ard also there are found to be a number of houses in which one or more ases have been reported for a series of years. There are in fact 7 houses which 61 deaths from tuberculosis, according to Dr. Tracy's report, lready referred to, have been reported since 1888; these same houses ave had 16 cases in them since 1893 (Dr. Tracy's report was from 1888 1892, inclusive).

It is evident, therefore, that identically the same conditions exist as the distribution of tuberculosis in these two wards. Wards IV. and VI.

were selected for special study, because they were in the old part of the city, and because, containing as they do a greater number of tuberculous cases than any wards in the city, they illustrate the fact most forcibly that the disease is concentrated in groups or foci of infection. The population, for the most part, is of the lowest class of Italians, Irish, Russian Jews, Greeks, Chinese, etc., but, as a rule, it is a comparatively fixed population, that is to say, with the exception of a few sailors' lodging-houses, the people may move from one house to another in the same neighborhood, but they do not go far from the old haunts. The centres of tubercular infection are found chiefly in over-crowded houses, rear tenements and dilapidated buildings, where ignorance, poverty and filth furnish a suitable soil for all infectious diseases, as well as tuberculosis.

But though tuberculosis is more thickly distributed in these wards and in the old part of the city, a similar distribution in groups, in a more limited degree, is found in other parts of the city, where the population is less dense and the hygienic conditions are better.

Dr. Tracy, in studying the distribution of this disease throughout the entire city, during the five years from 1888 to 1892, inclusive, gives the following figures in his report :

Total number of dwellings in New York City (census 1890)	81,828
Number of dwellings in which deaths from tuberculosis occurred	18,771
Percentage of total	22.94

Total houses in the city	81,828
Houses with deaths in only one year	14,479
Houses with deaths in more than one year	4,292
Percentage on total deaths :	
For one year	17.69
For more than one year	5.24

Houses with deaths in one year	14,479
Total deaths in same	15,511
Deaths per house	1.07

Houses with deaths in more than one year	4,292
Total deaths in same	11,232
Deaths per house	2.61

It will be seen from an examination of these figures that during the five years less than 25 per cent. of the dwellings in the city have had deaths from tuberculosis; that only 5¼ per cent. of the dwellings showed any evidence of infection by a repetition of tuberculous disease in years subsequent to the first; that the number of deaths was slightly more than twice as great in houses in which deaths occurred in more than one year of the five, but as there were deaths in every one of these houses during two years, at least, it could not be said that they showed any greater intensity of infection. It was found that 42 per cent. of the deaths from tuberculosis occurred in 23 per cent. of the affected houses, and in 5¼ per cent. of the total number of dwellings in the city. It would appear, Dr. Tracy concludes, that there is no question as to the infectious nature the disease. Though tuberculosis causes from 14 to 15 per cent. of the tal number of deaths in the city, yet it is confined within narrow limits d to a small number of houses.

These are the conditions in New York City which have existed here r, at least, the last eight years, as proved by statistics. But other rge cities in this country show the same thing. Dr. Lawrence F. Flick, Philadelphia, who has made a special study of this subject, comes to e following conclusions, from an investigation of the distribution of berculosis in the Fifth Ward, Philadelphia, extending over a period of years (1863–87):

That consumption is centralized; that it gradually changes its centre; at it completely changes its centre every three or four years; that it appears in the same locality in from one to two years; that it has a reference for filthy neighborhoods; that its grouping is identically the me as that of typhoid fever, smallpox, scarlet fever and diphtheria; at a house which has had a case of consumption will probably have nother within a few years, and may have a very large number of cases close succession; that when a case of consumption occurs in a house, pproximate houses are considerably exposed to the contagion; that ouses in localities where endemic after endemic has existed, have, evertheless, escaped the disease; that tuberculous diseases of various inds occur in the same localities and often on the same lots as consumpion; that whilst density of population and filth attract the disease, thiness of population and cleanliness afford no protection when the disease erm is introduced into a locality; that with our present knowledge of e etiology of the disease we have it in our power completely to wipe it ut in a single generation.

These facts, and observations of recent years taken from our own ties, would seem to be sufficiently conclusive in regard to the distribuon of tuberculosis and the infectious character of the disease.

But let us turn back a page of history and witness the results obtained y the enforcement of sanitary laws for the control of tuberculosis in ther times and countries. The history of tuberculosis in Italy during a ntury's experience under the influence of preventive laws, as narrated y Dr. Flick,* is most instructive and well worth recalling just at resent.

In 1782 the death rate from tuberculosis for the kingdom of Naples nd for Italy was 10 per 1,000. The disease raged almost in epidemic rm. Vigorous measures were taken to check the spread of the isease, and a law was passed making tuberculosis a returnable disease n penalty of a fine of 300 ducats ($684) for the first offense, and, pon repetition, of banishment for ten years; any layman who assisted the evasion of the law was sent to prison; the clothes and chattels of the fected person were destroyed by fire; infected houses were thoroughly novated, doors and windows replaced by new ones, the walls replastered; e sick poor were removed to hospitals and isolated. It is not known ow long this drastic law remained in force, but evidently for a considerable length of time it must have been carried out vigorously, and, even when relaxed, it created among the people such a fear of the disease that its effects have been felt ever since. As a result of this law, the death-rate from tuberculosis in Italy was reduced from 10 per 1,000 in 1782 to 1.29 in 1887. That part of Italy which formerly constituted the kingdom of Naples, in the country districts and small towns, is now practically free from the disease; and the mortality from consumption for all Italy is lower than that of any other country in Europe, with the possible exception of Spain.

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* Prevention of Tuberculosis, by Dr. L. F. Flick, 1890.

"When side by side with the reduction in the mortality from tuberculosis in the kingdom of Naples and in the operation of the Neapolitan law," says Dr. Flick, "is placed the reduction which has taken place in England during the last 40 years from the same disease, as the result of isolation in special hospitals, it can certainly no longer be said that the prevention of this disease is a mere theory. In England there has been a reduction of 50 per cent. in the mortality from tuberculosis in 40 years as the result of isolation, or from 3 to 18 per cent. of all cases a year. In the kingdom of Naples the disease has been nearly exterminated in 100 years, by a system of isolation and disinfection, or rather destruction of infected objects. Either of these facts, standing by themselves, might be looked upon as a mere coincidence; but, taken together, they must be accepted as the exponents of a fixed law. They show that tuberculosis is not only a preventable disease, but that it can be prevented by simple, easy methods. * * * If empirical methods could produce such results in Italy, and isolation on a comparatively small scale* could produce such effects in England, what would be the result of well-regulated scientific methods for its prevention?"

The conclusions which may be drawn from this investigation are the following:

(1) That the distribution of tuberculosis in New York and other large cities is positive evidence of the infectious character of the disease.

(2) That tuberculosis is not uniformly diffused through a community, not even in those localities where it occurs most frequently, but is confined within narrow boundaries, as in certain streets and within the walls of certain houses.

(3) That though there may be some danger of infection from the inhalation of dust in the open air in crowded parts of the city, it seems probable, from the fact that tuberculosis is found clinging to certain houses, that a prolonged exposure to a concentrated atmosphere of infection, as living in an infected room or in close contact with a consumptive person, is generally necessary to contract the disease in this way.

(4) That there is every reason to believe that the inclusion of tuberculosis in the list of notifiable diseases and the enforcement of sanitary measures for the control of the disease—such as inspection, disinfection and renovation of premises, and isolation of cases, when necessary, in special hospitals for consumptives, situated on the outskirts of the city—will greatly lower the death-rate from tuberculosis, even if it is too much to hope, as yet, that the disease can be entirely eradicated.

(5) That these conclusions are confirmed by the observation and experience of the most conspicuous physicians of the day, as well as by scientific investigation, and by the history of the disease in all ages and countries.

Apropos of the present discussion, the following conclusions of Dr. William Murrell, of London, in his clinical lectures on the prevention of onsumption (1895) are worth quoting. Dr. Murrell maintains that to ssen the mortality from consumption there must be combined legislative ction and personal effort.

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* According to Dr. Flick, there were in 1890 in Great Britain 18 hospitals for the treatment of tuberculous diseases, which all together accommodate from 6,000 to 7,000 in-patients annually. Of the 18, only 3 are exclusively for tuberculous diseases. Fifty per cent. represents the percentage reduction for 40 years; the reduction for a single year was over 15 per cent., the percentage of isolation 3 to 18 per cent. a year.

In the first category we aim at—

(1) The ultimate inclusion, when public opinion is ripe for that step, of consumption in the st of notifiable diseases.

(2) Public and official announcement of the fact that, in the event of a person having died of onsumption, the rooms occupied by him will be disinfected by the sanitary authorities free of arge. The facilities for disinfection should extend to any dwelling which has been vacated by a onsumptive person, and should be enforced in the case of hotels and lodgings at health resorts equented by sufferers from chest diseases.

(3) The passing of an act making it illegal to let any house or room in which any person, ithin two months, has suffered from consumption, without having had it properly disinfected.

(4) To make it a punishable offense by fine or imprisonment for any person letting a house room willfully to conceal or deny that there has been consumption in the house.

(5) To call the attention of shipping agents to the fact that there is danger to a healthy person occupying the same cabin with a consumptive, especially on long voyages, and when, from the clemency of the weather, the passengers are not much on deck.

(6) To make it compulsory for a consumptive person taking a long voyage by sea to notify e nature of his complaint before starting.

(7) To call the attention of railway companies, on lines connected with well known health sorts for consumptives, to the necessity for having the sleeping carriages carefully cleansed with ome disinfecting solution, and above all thoroughly aired.

(8) The removal of hospitals for consumptives in large cities to some convenient and open iburb.

(9) The exercise of greater care in the inspection of carcasses intended for food, and the comulsory rejection of those indicating tubercular disease.

(10) The rejection, as an article of fluid food, of the milk of tubercular cows.

(11) The inspection of herds by paid officials, with the view of destroying tubercular disease, nd isolating or destroying tubercular animals.

(12) The prevention of over-crowding amongst animals intended for consumption as food.

(13) The prevention of over-crowding amongst people, by regulating the amount of cubic space lloted to each person in common lodging-houses, workshops, etc.

(14) Back-to-back houses should be condemned, and the height of houses in cities should be n proportion to the width of the streets.

(15) Blind alleys should be opened out, and the custom of building houses at right angles to he length of the streets should be forbidden.

(16) Dusty occupations should be strictly regulated, so as to minimize the danger to those who re compelled to follow them.

(17) Convents and other religious communities should be periodically inspected by some independent authority, with a view of ascertaining the general condition of health of the inmates, and uggesting such sanitary and other measures as may seem necessary.

In the second category the following points are of importance:

(1) No one should consent to sleep in the same room with a person suffering from advanced hthisis, especially when the expectoration is abundant.

(2) The temperature of the room occupied by a consumptive person should not be too high, specially when he is confined to bed, and efficient ventilation should be secured, preferably by neans of open windows.

(3) The patient should expectorate into a spittoon containing the solution of the local Health Department, or some other equally good disinfectant. The expectorated matter should be estroyed by mixing it with fine coal and burning it in the fire.

(4) The pocket-handkerchief used by the patient should be thrown into a bucket containing a ood disinfecting solution, and should be scalded before being sent to the wash. Instead of rdinary handkerchiefs, a paper substitute, or pieces of rag, may be used, and then be burnt.

(5) It should be remembered that the risk of conveying the disease from the sick husband to he healthy wife, who nurses him, is great.

(6) The wife who nurses a husband suffering from consumption should get out in the fresh air s much as possible, and should do all in her power to maintain the condition of her own health.

(7) Never travel on board ship in the same cabin with a consumptive person.

(8) Food should be well cooked, not only superficially, but throughout.

(9) In the case of tuberculous children, or of people predisposed to phthisis, it is a good plan to boil all milk previous to use.

(10) Those predisposed to phthisis should select non-sedentary occupations, and should be encouraged to spend as much time as possible in the open air, and above all, in direct sunlight.

(11) People should be taught to value the importance of amusement of all kinds, and to recognize the danger of leading monotonous and depressing lives.

(12) The children of phthisical parents should devote much time to athletic exercises, and should not be allowed to follow sedentary occupations.

(13) They should be encouraged to migrate, and not to live in the house which their parents occupied.

Respectfully submitted,
ARTHUR R. GUERARD, M. D.,
Assistant Bacteriologist.

APPENDIX.

POINTS FOR CONSIDERATION SUGGESTED BY THE ACCOMPANYING TABLE OF MORTALITY FROM TUBERCULAR DISEASES.

BY

ARTHUR R. GUERARD, M. D.,
Assistant Bacteriologist.

According to the official reports of New York, London, Paris, Berlin and Vienna, there has been a gradual but steady decline in the death-rate from tubercular diseases during the last ten or twelve years. To what is this due? It has been attributed, and with reasonable grounds for the assumption, to the more active sanitary precautions which have been taken by the Public Departments of Health, particularly since 1888–1889, in regard to tuberculosis, and to the education of the people, by means of circulars of instruction, for the disinfection and destruction of tubercular sputa, the chief mode of communicating the disease.

If this be true—and there is no other known cause to which we can reasonably attribute the reduction of mortality occurring simultaneously in various parts of the world—and these hygienic measures, inadequate as they have been, have produced such distinctly good results, how much more may we hope to accomplish by organized legislative control, and the establishment of public hospitals for the systematic treatment of the tuberculous poor?

But, it may be asked, will it pay to do this? Can we afford to save the victims of such a widespead disease as tuberculosis? It is true that the problem involves a large expenditure of time and money; that the number of tuberculous persons is immense, and that the establishment of public hospitals will entail a great outlay of capital. But when into comparison with this is brought the loss of life and money to the State or community from the annual deaths from tuberculosis, even the cost and vastness of such an undertaking, if it offers a probable chance of success, sinks into utter insignificance.

In a recent lecture delivered at the Franklin Institute, Philadelphia, Professor Mason, of Troy, N. Y., has attempted to estimate the cost of typhoid fever to the City of Philadelphia. He says:

" According to Rochard, the economic value of an individual is what he " has cost his family, the community or the State, for his living, develop- " ment and education. It is the loan which the individual has made to " him by his relatives and the State, in order to reach the age when he " can return it by his labor. Chadwick considers an English laborer " equivalent to a permanent deposit of $980. Farr gives $780 as the " average value of each human life in England."

The average annual deaths from tubercular diseases in New York City from 1884 to 1896, inclusive, were 6,072, or a total of 78,943 deaths from this cause. In 1896, there were 5,926 deaths from tubercular diseases, of which 4,770, or 253.7 deaths per 1,000 deaths from all causes, occurred between the ages of 15 and 65 years, that is, during the period of the greatest productive power of the individual.

Now, estimating the value of a human life in New York at $1,000, which is certainly a very moderate estimate for this country (Mason estimates it at $2,000), and taking the average annual death-rate from tubercular diseases to have been 6,072, there has been an actual loss to this community of $6,072,000 per annum, and a total loss of $78,943,000, during the 13 years, from this cause alone. But these persons were incapacitated from work for a considerable length of time before they died, during which period they received no wages, and the city lost in productive power to that extent. Estimating the average wages of the 6,072 persons at $1 per day, and the lost time at three months, or ninety days, at least, we find that there was a further loss to the community of $546,480. Leaving all other details out of the calculation, such as nursing, doctors' bills, funeral expenses, etc., which are included by Professor Mason, it appears that there has been a total annual tax of at least $6,618,480 levied by tubercular diseases on New York City.

In this estimate only the actual deaths reported as due to this cause have been taken into account; but, doubtless, many deaths really caused by tuberculosis were reported as due to some other disease, and, at the same time, at least 20,000 living persons in New York have suffered from tubercular diseases, many of whom have been incapacitated from work for a longer or shorter period. But taking only those that have died, and translating this loss to the city into a money value, there has been an annual loss to the community of at least $6,500,000, as the result of the ravages of this fell disease; and it may not be exceeding the bounds of possibility to place this loss at not less than $10,000,000.

According to the most recent investigations, based upon practical results obtained from the treatment of tuberculous patients in special hospitals, at least three-fourths of those treated, during the earlier stages of the disease, may be restored to health and productive capacity for some time to come, and many may be permanently cured; added to this are the benefits, which may accrue to the healthy members of the community, from the isolation of infectious persons and the prevention of the spread of the disease.

This subject of the reduction of mortality from tubercular diseases, both from a humanitarian and economic point of view, would, therefore, seem to be worthy of the earnest consideration of all thoughtful men, statesmen and legislators, as well as sanitarians and physicians; but it is not so much a question of finances; it concerns the welfare of the State.

MORTALITY FROM TUBERCULAR DISEASES.

General Death-rates from all Causes. Deaths and Death-rates from Tubercular Diseases per 1,000 Population in New York, London, Paris, Berlin and Vienna from 1884 to 1894, inclusive.

From the Official Statistics.

	NEW YORK CITY.			LONDON.			PARIS.			BERLIN.			VIENNA.		
YEAR.	General Death-rates from all Causes.	Deaths from Tubercular Diseases.	Death-rates from Tubercular Diseases.	General Death-rates from all Causes.	Deaths from Tubercular Diseases.	Death-rates from Tubercular Diseases.	General Death-rates from all Causes.	Deaths from Tubercular Diseases.	Death-rates from Tubercular Diseases.	General Death-rates from all Causes.	Deaths from Tubercular Diseases.	Death-rates from Tubercular Diseases.	General Death-rates from all Causes.	Deaths from Tubercular Diseases.	Death-rates from Tubercular Diseases.
1884.........	25.82	6,939	4.45	20.39	12,537	3.12	25.44	11,625	5.19	26.33	4,534	3.62	26.80	5,470	7.20
1885.........	25.55	5,913	4.26	19.97	11,850	2.90	24.38	.....	...	24.38	4,657	3.61	28.20	5,574	7.35
1886.........	25.99	6,349	4.42	19.89	12,164	2.93	25.25	12,258	5.96	25.63	4,547	3.40	26.60	5,525	7.24
1887.........	26.32	6,007	4.06	19.53	11,424	2.71	23.92	11,818	5.15	21.84	4,388	3.26	25.60	5,110	6.48
1888.........	23.39	6,073	3.99	18.42	10,929	2.54	22.92	11,472	4.93	20.30	4,554	3.16	25.30	5,054	6.46
1889.........	25.32	6,041	3.86	17.47	11,162	2.56	23.78	11,047	5.11	23.00	4,938	3.30	24.50	4,802	5.85
1890.........	24.87	6,409	3.97	20.98	12,006	2.94	23.70	12,585	5.26	21.51	4,684	3.02	24.40	4,876	5.85
1891.........	26.31	5,909	3.56	21.11	11,854	2.61	22.45	12,430	5.13	20.82	4,743	2.96	25.01	7,940	5.78
1892.........	25.95	6,061	3.55	20.31	11,465	2.68	23.24	11,153	4.54	19.97	4,357	2.66	24.97	7,745	5.90
1893.........	25.00	6,163	3.51	20.83	11,426	2.65	22.25	12,267	4.92	21.01	4,671	2.72	24.04	7,418	[illegible]
1894.........	22.76	5,730	3.16	17.80	10,570	2.43	21.32	12,376	5.10	17.57	4,283	2.51	23.20	7,427	[illegible]
1895.........	23.10	6,283	3.34												
1896.........	21.54	5,926	3.06				(Other data not yet published.)								
Average, 1884-89 ..	26.01	....	4.23	19.58	....	2.84	24.38	.....	5.20	23.69	....	3.39	26.58	....	6.83
Average, 1889-95 ..	25.08	....	3.67	19.75	....	2.65	22.78	.....	5.10	20.64	....	2.86	24.35	....	5.53
Decrease, Per cent.	......		14.8	.....		5.6	......		1.9	......		15.6	......		19.0

NOTE.—The ratio of deaths to population has been calculated from the figures given in the official reports, but the mortality rates for Paris are somewhat higher than they should be, as the last census in Paris was taken in 1891, and no allowance is made for increase of population. In Berlin, on the contrary, the rates are somewhat lower than they should be, owing to the mode of estimating the population in Berlin, which, when the census was taken, in 1895-96, proved to be incorrect. In Vienna, in 1891, the suburban districts were included in the city limits, which accounts for the greater number of deaths from that time.

From an examination of this table, it appears that tubercular diseases have caused from one-fourth to one-seventh of the deaths from all causes in these five great cities, during the period from 1884 to 1894, inclusive; that along with the decline in the general death-rate, there has been a gradual but decided decrease in the death-rates from tubercular diseases, not in one but in all of these cities; and that the lowest death-rates have been in London, Berlin and New York.

In 1888 and 1889, the sanitary authorities began to take more active steps to prevent the spread of tuberculosis, except in England, where such precautions were previously introduced. The table shows the average death-rates from tubercular diseases from 1884 to 1889, and from 1889 to 1895, with the percentage of decrease of mortality from this cause, during the latter period. The greatest percentage of decrease in the death-rate from tuberculosis has occurred in New York, Berlin and Vienna. New

York City shows a still further decrease in mortality in 1895 and 1896. The statistics for 1895 and 1896, for the other cities, have not yet been published in full.

Further Evidences of the Existence of a Specific Infective Agency in Dwellings which have been observed to foster Tubercular Disease.

In addition to the evidence already given of the existence of a specific infective agency in dwellings, the following instances may be cited as bearing upon the same subject:

Kempf ("Louisville Medical News," March 27, 1884) reports that—"Phthisis appeared to be introduced into a convent, well situated and ventilated, by a girl of eighteen, with a result that, within four months, nine sisters, regarded as exceptionally healthy, became consumptive, and four died in the course of the year. After complete isolation of the sick and cleansing of the rooms, the epidemic was stopped."

Sendter ("Münch Med. Wochenschrift," 1889, No. 43), records that: "In the Island of Frauen Chiemsee, with a population of about three hundred persons, the deaths from tuberculosis since 1880 never exceeded seven in the decade until the last; while the Cloister, with from 20 to 40 members, was immune until 1860. During the sixties two died of tuberculosis; the same in the seventies; while during the last decade eleven fell victims to the disease."

Ransome ("Some Evidences Respecting Tubercular Infected Areas," a paper read before the Epidemiological Society, referred to also in his Milroy Lectures), gives an account of "the prevalence of phthisis in certain streets of badly-built houses, deficient in supply of fresh air." Referring to instances in which two or more deaths from phthisis occurred in the same house, he says, "altogether there were 21 such coincidences," and 15 of them (30 deaths in all) occurred in narrow streets, cul-de-sacs or small courts. This was in a district in Ancoats, Manchester, in a period of five years. In a district in Greengate (Salford) 8 deaths were in four houses, or four "coincidences." In another district, out of 40 cases in six years, 10 were in five houses. In his Milroy Lectures "On the Causes and Prevention of Phthisis" (p. 65), Dr. Ransome quotes also a personal communication from Dr. Niven, of Oldham, showing that out of 3,001 deaths from tuberculosis during eleven years, in 302 instances there were two or more in a house.

Dr. Janeway (Archives of Medicine, quoted in the British Medical Journal, 1883, Vol. I., 377), reports that "a gentleman died of phthisis after two years' illness in February, 1882. His sister and her husband occupied his room after his death. The brother-in-law began to fail five weeks afterward and in May was a subject of acute phthisis."

Dr. George Burney (British Medical Journal, 1885, I., 774) mentions the following: "A fine young Scotch girl of a healthy, long-lived family was afflicted with phthisis. On inquiry it was found that some few months before she had been given a bed-room which had just been quitted by a maid-servant with phthisis."

Dr. Niven (Public Health, II., 206) gives a very similar case: "A married woman from Oldham went with two children (one a lad of ten years old) to Southport, to join her husband in September, 1887. The husband, wife and two children all slept in one front room. In the same house was a woman suffering from consumption, said to have been contracted from her husband, who had previously died of the same disease. As the weather got colder, this consumptive woman asked them to change rooms with her, as her bedroom was colder than theirs. This was done. The Oldham woman used to complain of a peculiar odor in the room, which did not seem to have had any special cleansing or disinfection. In January, 1888, the boy, ten years old, died of "inflammation of the brain." He had been ill a month, and from the history his fatal malady was almost certainly tubercular meningitis. The Oldham woman became pregnant in Southport, but removed shortly afterward to Oldham, and was there confined in June, 1888, but before the birth of the baby she lost flesh, and showed the first symptoms of phthisis. The baby died in June, 1889, of tabes mesenterica, and she died in October of phthisis."

Dr. Heron quotes the following ("Evidences of the Communicability of Consumption," 1890, Appendix, p. 153), from Kruche (Deutsch. Med. Zeit, 1882): "A young, robust lawyer spent some time at a health resort, and some weeks after his return home showed symptoms of a rapidly fatal attack of consumption. It was found on inquiry that in the place referred to he had occupied a room and bed which had just previously been vacated by a consumptive who suffered from suppurating sores."

One of the most striking examples of this mode of communication is quoted by Payne (who also quotes most of the previous cases cited), in an article on "Tuberculosis as an Endemic Disease," read before the Epidemiological Society, London, 1892–93, from Englemann (Berlin

Klin. Woch., 1889, Journal 7, p. 65, which relates to "a particular dwelling or flat in a large house occupied by the families of several glass blowers employed in a certain factory. This occupation is one known to produce remarkable liability to phthisis, and Engelmann believes that 75 to 80 per cent. of the workmen in this particular place die of it. It is well known that this frequently has been ascribed, among other causes, to direct infection from mouth to mouth by the blow pipe. However, that would not explain the special incidences here described. The house was built about 1865, and was generally in tolerable sanitary condition. The particular dwelling in question was badly ventilated and lighted. It was occupied from 1865 to 1873 by three families in succession, who were all healthy. In 1874 a family named Nestle entered, in which the mother was already consumptive, and had lost a son from the same disease. She died there from phthisis, and shortly afterward the family left, having lived there for one year only. The next occupants were a family (Gotz) of seven persons, all in good health, though there was a history of that disease in the mother's family. After one year's residence in this dwelling they left, and at a later time it was found that the father, mother and one son had died of phthisis, and a fine boy of chronic peritonitis. The third family occupying the dwelling were healthy on arrival, and had no hereditary taint. A child born in the house died of meningitis; another child died of 'marasmus'; another boy acquired hipjoint disease. Later on the father died of phthisis, and another child of meningitis; the mother became phthisical, and a surviving girl was extremely scrofulous. A fourth family came in after the last mentioned; all healthy. The mother became phthisical, and bacilli were found in the sputum. Two children died of meningitis under one year old."

"Summing up the history, it appears that for eight years (1865–73) the dwelling was free from tubercular disease. Then came one year's tenancy by a person already tuberculous. After this, in a period of twelve years, at least 12 cases of tubercular disease were traced to this source. It is noted that the dwelling was never vacant, the new tenants entering while it was, so to speak, still warm from the last; and during the whole period it was never painted or cleaned. Engelmann asserts that this neglect did not occur in other parts of the same large house, and that no similar instance of tubercular disease clinging to a dwelling was observed in them."

The following case is recited by Dujardin-Beaumetz (Revue de la Tuberculose, 1893, p. 156), from a report of Dr. Ducor, in Paris: "A family of 11 persons—father, mother and 9 children—hired a small apartment in October, 1890. This apartment had been occupied since 1888 by a man and his wife; the man died of tuberculosis in May, 1890, and the woman twenty days after, of the same disease. The mother and two children slept in the room where these two deaths had occurred. In 1893 these three persons, the mother, a little girl of nine years and an infant of sixteen months old, all showed symptoms of tuberculosis accompanying bronchitis after measles. Dr. Ducor, struck by the symptoms of the disease, and the fact that the occupants or this room were the only members of the family who were affected in this way, made an investigation into the matter, which resulted in discovering the history of the former occupants. He then observed that the wall paper of the room in question was stained with the remains of dried sputum. Submitting this paper to the medical inspector of epidemic diseases, not only were tubercle bacilli found under the microscope, but two guinea pigs, inoculated with an emulsion made with fragments of the paper, gave evidences of tuberculosis. The following conclusions are drawn from these observations:

"First—Tuberculous sputa deposited in a room, as on wall paper, dries there, and may remain virulent for at least two years.

"Second—According to the degree of virulence or of attenuations present, other things being equal, the absorption of the tubercular germs may give rise to a general tuberculosis, a local tuberculosis, or a scrofulous condition.

"Third—Too much importance cannot be attached to the destruction of sputa and disinfection of premises occupied by consumptives, not only for the sick and their families, but for those who come after them to live in the same apartments."

Dujardin-Beaumetz, commenting on this case, remarks that "it is by no means isolated, many observers having noted analogous cases. The infectiousness of tuberculosis is now admitted by all without dispute, and it is well known that the chief mode of communicating this infection is through the sputa. In view of the possibility of such an infection occurring from dwellings occupied by tuberculous patients, there would seem to be no escape from the logical conclusion that tuberculosis should be included in the list of contagious diseases, for the protection of the public."

But in spite of these facts, which M. Beaumetz admits have been satisfactorily demonstrated, he expresses the opinion that we should still hesitate in this matter for fear of offending the sensibilities of families who are affected with this disease.

Apropos of this question, Cornil (Ibid., 1894, p. 87), communicates to the Academy of Medicine in Paris, February 27, 1894, a letter signed by several distinguished physicians, Gilbert, Berlioz, Fleury, Roux and thers, directors of the Sanitary Department of Havre, Grenoble, t. Etienne and Lyons, requesting—

that tuberculosis be placed among the list of notifiable diseases. They regret that extra-cademical considerations and the 'fear of offending people' should deter the Academy from king action in this matter, for, they say, such apprehension is entirely without foundation. s proof of this, attention is drawn to the fact that out of 300 disinfections of premises after deaths om tuberculosis, made in Paris between January 12, 1892, and August 31, 1893, according to e sanitary regulations, in only 22 instances was there any opposition whatever. They conclude om this that the public has already accepted the idea of the infectiousness of tuberculosis and are uite prepared to see it placed under sanitary control along with other infectious diseases. If ny opposition should be encountered at any time, the attending physician in the case, by the mployment of a little tact, will find it very easy to reconcile his duty to the family with his duty the public. They, therefore, request the Academy to include tuberculosis among the list of otifiable diseases."

In 1895, according to the official reports, there were 9,787 tuberculous remises disinfected in Paris; in 1896, 8,560 premises, or 1,227 less than he previous year. This is due to the fact that there were fewer deaths om tuberculosis in 1896 than there were in 1895. Whether this reducion of mortality is to be attributed to the improved sanitary regulations n regard to tuberculosis, is not stated; but it would not be too much to ssume that at least a part of the reduction is due to the education of the ublic as to the infectiousness of the disease, and the precautions which hey themselves take to prevent its spread, as well as to improved public ygiene in the City of Paris. Other causes, as the clemency of the easons, etc., may also have been at work.

The Spread of Tuberculosis Among Cattle and Animals, as Illustrating the Infectiousness of the Disease.

In the report of the Commission on Tuberculosis in Cattle of the State of New York, 1895, we nd the following: "Dr. Ruhling of Gottingen, writing (1774) of the disease in animals, says: 'The malady is transmitted to sound animals by direct contact of animals standing side by side the stall and licking each other, and breathing the expired air direct from the diseased lungs; the equenting of the same pastures will also serve to propagate it.' Fromage, in the Dictionaire de ogier, article 'Phthisis,' says: 'Men in art are very much in accord that this malady is not ntagious, but some stock owners think differently.' Hazard, who saw much of tuberculosis in e Parisian dairies in the concluding decade of the last century, said that 'most of the veterinians looked upon the disease as contagious, and that some of the physicians believed the same of e phthisis of man.' Cruzel, in his work, 1868, says: 'This fœtid expired air, inhaled immeately by another cow upon a sound lung, gives the latter tuberculous infection. It is a matter every-day experience to the veterinarian. Two oxen or cows are kept in the same stable, take eir food from a common rack or manger, lie in the same stall, and respire nose to nose. The e is, to all appearances, perfectly sound; the other is in as good a condition and is vigorous, but coughs from time to time and its breath is foul. Soon we notice that the animal that does not ugh eats with less appetite, it loses flesh, and soon it is unequivocally affected with the same alady as the first.'"

Nocard (Annal d'Hyg. et de Med. Leg., Nov., 1892, p. 385), says that "formerly the Parisian iries were celebrated for being infected with tuberculosis; the cause was that the cows remained o long in the stables, during which time the infection was communicated from one cow to other. There is less danger of this at present, because the animals are only kept in the stalls ring the milking period; afterward they get with calf again, or are slaughtered when they give milk. In the country the conditions as regards infection are the same. If a tuberculous cow s unfortunately been introduced into a stable, after it has been there a certain length of time it ay be said that this stable has become infected and the disease taken up its abode there; all the ws, with very rare exceptions, will become tuberculous one after the other." Nocard gives any cases illustrative of this fact, a few of which may be noted here:

"In the dairies of St. Helaine, out of a herd of 56 cattle, 25 were found to be tuberculous in une, 1891. It was decided to isolate them at once, and kill them off as they were needed. At e end of the year 15 other animals were found to be tuberculous, and they were isolated. The that remained showed no symptoms of tuberculosis on clinical examination, but when subjected to the tuberculin test, 10 more proved to be tuberculous, which was confirmed by autopsy. Thus, out of 56 cattle in this herd, 50 became tuberculous." Nocard considers that this infection was due to the stable in which the tuberculous cattle had originally been confined.

"On another farm, 10 cows of the finest type of Jerseys had been kept for two years. They were proved to be tuberculous by the tuberculin test, and the diagnosis was confirmed by autopsy. Only one cow which did not react to the tuberculin injection remained healthy. This stable was kept in the most perfect hygienic condition, both as to food and habitation, and it was regularly disinfected at certain intervals. Another stable contiguous to the first and communicating with it contained 9 other cows. None of these were found to be tuberculous." Nocard directs attention to this interesting fact, as showing that "infection by the atmosphere from a distance is next to *nil;* that in order to produce tuberculous infection there must be intimacy, repetition and prolonged contact of the healthy with the infected subjects."

Nocard and Leclainche ("Les Maladies Microbiennes des Animaux," 1896), give some interesting statistics of bovine tuberculosis, showing that the disease has enormously increased within the last few years, as the result of infection. In Great Britain, the progress of the disease has been so rapid during the last fifteen years that certain breeds of cattle, notably the Durham, threaten to die out entirely in a short time. Walley and Fleury have directed attention to this fact as "a clear proof of the spread of the infection." In Denmark, until 1789, the disease was practically unknown except by name. In 1818 it was still extremely rare. In 1840, tuberculosis was imported into Denmark from Schleswig-Holstein, and in 1850, it had spread all over the country. In Liepzig (Rieck, "Die Tuberculose unter den Rindern," Archiv. f. Thierheilkd, vol. XIX., 1893), there were found, on the examination of cattle at the abattoirs, 11 per cent. tuberculous in 1888; in 1891, 26.7 per cent.; in 1894, 29.1 per cent. Among cows, the increase in tuberculosis was from 17.5 per cent. in 1888 to 38.6 per cent. in 1894. It is noted that the spread of tuberculosis is very much more rapid among the adult cattle than the calves. These facts have been observed in every part of the world where cattle have been examined carefully. In Australia, in the province of Victoria, where tuberculosis, twenty or thirty years ago, was unknown, to-day from 15 to 20 per cent. of tuberculous cattle are slaughtered annually.

Jeffries ("How Tuberculosis is Acquired," Boston Med. and Surg. Journ., Sept. 3, 1891), refers to Bayard's statistics (Archiv. f. Wissench u prakt. Theirheilkd. XV., p. 1, 1889), showing that the curves of tuberculosis in cattle and man follow each other closely all through Baden and Bavaria. He remarks that, "the case is cited to show the dependence of human tuberculosis on that of cattle. It would be just as logical to argue the other way. If men catch tuberculosis from eating cattle, where do the cows get it—from eating each other? The proper place to look for the cause is in ways common to both, that is, indirect infection, not food."

That human and bovine tuberculosis are identical may be inferred from the fact that the germ found in the two cases is absolutely indistinguishable. Its morphology is the same; its peculiar behavior in regard to staining fluids is identical; it grows in the same culture media at the same temperatures, and has the same appearance and chemical products of its growth; it has the same thermal death point; it produces the same pathological lesions in both subjects. If inoculated from man, ox, horse or pig upon guinea pigs, the same pathological phenomena are produced in the various cases. There are cases to be found in the literature of the subject which give evidence of the disease having been communicated from tuberculous animals to man, and vice versa, when living in close and prolonged contact, as well as from the ingestion of tuberculous flesh and milk, and by means of infection through wounds. That which is indistinguishable in all its relations and conditions, and which is interchangeable, cannot be otherwise than identical.

The Prevalence of Tuberculosis in Insane Asylums and Prisons, etc., as Evidences of the Infectiousness of the Disease.

Dr. Babcock, Superintendent of the Hospital for the Insane, in Columbia, S. C. (American Journ. of Insanity, Oct., 1894), has collected the following statistics on this subject:

"While statistics prove that tuberculosis causes one-seventh of the deaths among the whole population of the world, the figures collected by Hagen (Zeitschrift, f. Psychiatrie VII., 1850, p. 759), from the reports of many asylums, showed that among the insane more than one-fourth of the mortality was due to this fatal disease. In 1892, Clouston, who has studied this subject more than thirty years, concludes (Tuke's Dict. of Psychology Med., p. 939), that 'the fact that under the most favorable conditions of life and treatment that we can devise at present for the insane in the best asylums, 3 of them die of pulmonary tuberculosis to 1 person in the general population at the same age, is one full of interest and significance.' 'So great is the liability to tuberculosis,' says Ireland, 'in certain prisons, that commitment to them is almost equivalent to a death sentence.' Cornet found that during a period of fifteen years the mortality from phthisis among males in Prussian prisons was 45.82 per cent. of all deaths; in females, 49.33 per cent. In the prisons of Austria, the mortality from this disease reached 61 per cent. during four years, while in the penal institutions of Bavaria, it was only 38.2 per cent. during eight years (von Zeimssen, Pathology and Treatment of Tuberculosis, Wood's Monographs). Among the 1,400 convicts of the Illinois State Prison at Joliet, fully one-third have consumption, and nearly all the deaths in that penitentiary are due to this single cause (Journ. American Med. Assoc., May 6, 1893). Clouston, commenting on the reduction of the mortality from tuberculosis in asylums since improved sanitary measures have been adopted, says that 'in older institutions, where the hygienic conditions were bad, the number of deaths from phthisis was often from 25 to 30 per cent. of the whole number who died, and when the post mortem records of these institutions were examined, from 40 to 60 per cent. showed signs of tubercular deposits to a greater or less extent. The sanitary conditions of modern hospitals for the insane, however, are much better than they were fifty years ago, * * * so that recent statistics of the prevalence of phthisis are far more favorable than they used to be. In the Royal Edinburgh Asylum for the Insane, from 1842 to 1863, the percentage of deaths from phthisis in the whole number of deaths was 29, while for the ten years, from 1879 to 1888, it was only 13.6 per cent. During the first twenty-three years of the existence of the Inverness Asylum (Scotland), 35.4 per cent. of the whole deaths were due to phthisis.' In referring to the report of that asylum for 1887, a writer in the Journ. of Mental Science (Jan., 1881), remarks that 'when 18 deaths out of 47 (38 per cent.) are due to phthisis, it is time to cease speculations concerning the prevalence of phthisis in the Highlands, and to take active practical steps to discover the real cause of the pest.' "

"In the United States, the death-rate from tuberculosis is also high in some hospitals for the insane. According to Workman (Amer. Journ. of Insanity, July, 1862), in eight American asylums consumption was the cause of 27 per cent. of the whole number of deaths. In the Columbia Asylum, the mortality from tuberculosis for the ten years ending November 1, 1893, was 22 per cent. of all the deaths. All the deaths from this cause occurred in certain wards in the older parts of the asylum, built in 1822; the remaining wards remained free from the disease."

The following table gives the death-rate from tuberculosis in 98 American asylums, collected by Dr. Babcock:

Number of Asylums.	Percentage of Mortality from Phthisis.	Number of Asylums.	Percentage of Mortality from Phthisis.
3	0.0	14	20.25
1	0.1	13	25.30
2	1.5	6	30.35
14	5.10	3	35.40
16	10.15	1	50.60
24	18.20	1	60.

The low mortality rates occurred in small institutions, the higher death-rates in larger asylums, the highest being found in colonies for the chronic insane.

The conclusions reached by Dr. Babcock in his study of the subject are as follows:

"1. That tuberculosis is two or three times as common in institutions for the insane as in the general population.

"2. That among the insane two-thirds of the cases have had an asylum residence of over one year.

"3. That the disease is frequently the result of hospitalism, and its prevalence may be regarded as a test of the sanitary condition of the institution.

"4. That improved sanitation alone has diminished the death rate, but has not exterminated the disease.

"5. That the disease is really ubiquitous, although some small well-conducted asylums are free from it.

"6. That asylum statistics, based upon clinical diagnosis alone, do not give the full mortality of tuberculosis.

"7. That in private houses the insane are not more liable to phthisis than are other people.

"8. That direct hereditary is probably less potent than has been supposed.

"9. That predisposition to tuberculosis may be congenital or acquired.

"10. That among the more important external predisposing influences are imperfect ventilation, absence of sunlight, dampness, defective plumbing and drainage, insufficient exercise, want of variety in diet; in fact, an unhealthy environment; but such psychical elements as depression of spirits, homesickness, loneliness, etc., may also play a part.

"11. The history of the disease, clinical observation and bacteriological investigation, all prove the disease communicable, the element of infection being a specific germ contained in tuberculous discharges.

"12. 'Being communicable, the disease is therefore preventable.' (Michigan State Board of Health.)"

Many statistics might be quoted to show that consumption prevails in prisons to a disastrous extent. Among others Hirsch gives the following, not already quoted: "In the United States prisons from 1829 to 1845 the mortality from phthisis was 12.82 per 1,000 prisoners at Philadelphia, and at Auburn and Boston 9.89 and 10.78 respectively; in Baltimore prison it was 61 per cent. of the mortality from all causes. In the French prisons, particularly those in which long terms of penal servitude are worked out, the death-rate from phthisis amounts to between 30 and 50 per cent. of the mortality from all causes. In the Dutch prisons it reaches the same height; in the Danish convict prisons it amounted, in 1853 to 1869, to 39 per cent. of all the deaths. Baly, in his report on the prevalence of phthisis from 1825 to 1842 among the convicts at Millbank penitentiary, England (quoted by Evans, Phthisiology, 1888), records that, 'when 31 out of 205 deaths were due to cholera, 75 of the remaining 174, or 43 per cent., were due to phthisis; while of 355 prisoners discharged during the same period on account of ill health, 90 were phthisical, and quite three-fifths of these, according to precedent, would have died of that disease if they had been left to complete the term. In that way we bring the annual mortality from phthisis at Millbank up to 13 per 1,000, or more than three times that of the London population at large."

"Pietra Santa gives the following facts for the prisons of Algiers: 'Of 23 natives who died in the public prison of Alger, 17 succumbed to phthisis; in the Central Prison of l'Harrach there were 57 deaths from phthisis in a total of 153, or 37.2 per cent.'"

The important influence of imprisonment in the occurrence of this disease is very clearly brought out by its prevalence in those regions where phthisis is in general a rare thing, as, for example, in lower Bengal. Webb quotes the following remarks by Green, with reference to the commonness of the disease among the natives in the prison of Midnapore: "After a careful examination into the early history and origin of the cases of this disease as they have occurred, I have been led to the conclusion that many of the men thus affected were previously hale and capable of earning their livelihood, and were not subject to cough before imprisonment. I find that after they have been working a few weeks or months on the roads here, and inhabiting the jail, they have become the subjects of attacks of inflammation of the lungs, etc., * * * which have ended in some cases in death * * * with all the symptoms of tubercular disease of the lungs."

"The great frequency of consumption in convict prisons may seem to be due to many of the prisoners bringing the disease with them; but that such is not the case follows from the well authenticated fact that most of the deaths from phthisis among prisoners do not occur until the later years of their term of confinement. At Millbank Penitentiary signs of a pulmonary affection on admission could be made out, as Baly tells us, in only 12 prisoners among 1,502 who entered in 1842, and in only 15 among 3,249 who were received in 1884. Among the convicts of 1842 there were 510 women sentenced to transportation, who remained at Millbank not longer than three months, and of these two fell ill with phthisis or scrofula during that time; whereas of the remaining prisoners no fewer than 47 became consumptive before the completion of their term of two or two and one-half years. It is further to be kept in mind that most of the convicts sent to Millbank had already served longer or shorter terms in smaller prisons elsewhere, and not a few of them more than one term, so that in a certain proportion of those who were found phthisical on admission to the central prison, the seeds of the disease might have been implanted while they were undergoing sentence previously."

"Kolb (Zeitschrift f. Hyg., Vol. XIX., p. 484), arrives at the same conclusions, as the result of his investigations in the prison of Kaiserslauten during ten and a half years (1882–92), namely, that the majority of cases of tuberculosis were contracted in the institution. Out of 934 prisoners admitted, 284 were later affected with phthisis. Four hundred and seventy of them were perfectly healthy on admission, and two-fifths of these became tuberculous in from six months to one year. Most of the deaths from tuberculosis occurred within the first two years; some died within one year and some in fifteen months."

"Cornet (Revue de la Tuberculose 1894, p. 184) gives the following statistics to show the reduction of mortality from tuberculosis in Prussian prisons since 1887, when sanitary measures were regularly applied in Germany for the prevention of the disease:

Deaths per 10,000 Prisoners.	Year.	Deaths per 10,000 Prisoners.	Year.
118.9	1875 to 1876	89.4	1887 to 1890
140.8	1878 to 1884	81.2	1890 to 1894
101.0	1884 to 1887		

"These figures are confirmed by the statistics for the whole of Prussia and other German states since prophylactic measures have been introduced. From 1875 to 1886 there was an aver-

:e mortality from tuberculosis of 30 per 10,000 inhabitants ; it has been reduced to less than 25. Saxony, the death-rate has fallen from 25 to 21 ; in Baden, from 30 to 26, as the result of saniıry regulations."

'ealth Statistics of the Catholic Nursing Orders in Prussia ; an Investigation into the Communicability of Consumption by Dr. Cornet (*Zeitschrift f. Hyg. Vol. VI., Part I.*, 1889, *and* "*Evidences of the Communicability of Consumption,*" *by Heron*, 1890).

These orders were selected by Cornet for special investigation, because their members, being ›und by a vow to remain for life in their respective institutions, are never permitted to leave connt life, neither when ill nor for any other reason. Thirty-eight convents were chosen for statis:al purposes, because their reports furnished the most reliable information in answer to the ques›ns asked. These reports were obtained through the Department of the Prussian Minister of ate, and are therefore in some sense official.

The communities, consisting of both male and female members, represent a yearly average of 028 persons and a sum total of 87,450 years of human life under observation during a period of years, from 1864 to 1889, inclusive, in which time there was a total of 2,099 deaths from all uses.

The following table gives a summary of the causes of death, number of deaths from various uses, and the percentage of mortality on the deaths in these 38 nursing orders during 25 years :

CAUSES OF DEATHS.	NO. OF DEATHS.	PER CENT. OF MORTALITY ON DEATHS.	CAUSES OF DEATHS.	NO. OF DEATHS.	PER CENT. OF MORTALITY ON DEATHS.
ıberculosis	1,320	62.88	Kidney disease	21	1.00
·phoid and typhus	177	8.23	Intestinal disease	27	1.28
ıallpox	20	0.95	Liver disease	18	0.85
olera	17	0.81	Abdominal disease	32	1.52
ɣsipelas	9	0.42	Spinal disease	17	0.81
ncer	50	2.38	Rheumatism	10	0.47
opsy	54	2.57	Gout	5	0.24
oplexy	30	1.43	Weakness and old age	28	1.33
lammation of lungs	74	3.53	Other diseases	86	4.09
art disease	77	3.67			
ıin disease	27	1.28	Total deaths	2,099	

It will be seen from an examination of this table that, while the death-rate from tuberculosis the general public is from one-seventh to one-fifth of all deaths, in these nursing communities ırly two-thirds, or 62.88 per cent. of the mortality from all causes, is due to tuberculosis alone. nearly one-half of the convents it was found that the death-rate from tuberculosis rose still ;her than two-thirds ; in some of them it was three-fourths of the mortality ; in two "Mother ›uses" tuberculosis was the sole cause of death. In convents where many of the nurses were gaged in attending upon surgical cases, among which there were few or no consumptives, the ›rtality from this disease was considerably lower.

The following table gives a summary of the ages at deaths from tuberculosis and other eases, and the average duration of life among the nursing orders :

CAUSE OF DEATH.	AGE.							
	15–20.	20–25.	25–30.	30–40.	40–50.	50–60.	60–70.	70.
berculosis	14	164	348	525	201	43	19	66
ıer diseases	9	79	124	186	147	107	81	47
Total	23	243	472	711	347	150	100	53

Average duration of life, 36.27 years.

It will be observed that the death-rates between the ages of 15 and 20 years and after 50 ars are comparatively low. The low mortality in the first case is accounted for by the fact that ɏ persons enter convent life below the age of 18 years, and, in the latter, it is due to the fact ıt the average age at death of the inmates is only 36.27 years.

It is seen that the highest death-rate in these communities is between the ages of 25 and 50 ars. Cornet states that the members of these orders are persons whose health at first is known to be excellent, because admission to membership is, amongst the other requirements, dependent upon the production by the applicant of a medical certificate to that effect. Their health is therefore at first, as a rule, better than that of their countrymen in general, and yet the average age at death of these originally healthy individuals, under the peculiar conditions in which they live in these convents, is lower by ten years at least than that usually estimated of men who are engaged in trades notoriously the most unhealthy, such as metal and stone workers, upholsterers, etc.

The following table gives a summary of Cornet's statistics comparing the mortality in the Prussian State as a whole with that of the nursing orders, estimated per 10,000 living people:

CAUSE OF DEATH.	15–20 YEARS.		20–25 YEARS.		25–30 YEARS.		30–40 YEARS.		40–50 YEARS.		50–60 YEARS.		60 YEARS.	
	State.	Orders.	State.	Orders.	State.	Orders.	State.	Orders.	State.	Orders.	State.	Orders.	State.	Orders.
Tuberculosis........	18.6	116.9	29.9	137.3	26.1	176.2	41.8	142.1	47.9	88.8	66.1	47.3	73.0	88.8
Other diseases......	29.7	87.7	38.3	79.4	45.3	63.2	64.2	52.7	96.0	61.2	172.6	145.7	483.8	495.2
Total...........	48.3	204.6	68.2	216.7	81.3	239.4	106.0	194.8	143.9	150.0	238.7	193.0	556.8	584.0
Excluding infectious diseases.	23.9	29.2	32.1	34.0	39.5	22.7	57.3	30.5	84.6	46.5	153.7	111.6	459.6	480.8

In studying this table it should be borne in mind that the great majority of the inmates do not begin convent life until they have reached the ages of 20 to 30 years, and that they die of consumption in the greatest numbers between 25 and 40 years of age. The novices and those who have most lately entered the convent have most of the rough work to do; they are required to clean the wards, make the beds and remove and wash pocket handkerchiefs and bed and body linen used by the sick.

Comparing the mortality in the Prussian State with that of the nursing orders it is seen, that between the ages of 15 and 20 years the general proportionate death-rate in the convents is four times that of the state; between 20 and 30 years of age it is about three times greater in the convents than in the state; between 30 and 40 years of age the convent death-rate is double that of the state; after 40 years of age the inmates of the convents and the general population begin to show more equally proportionate death-rates.

If from the total death-rate in the state and in the convents that portion of it due to tuberculosis be deducted then the marked difference between the two death-rates disappears to a great extent. If the mortality due to all infectious diseases, including tuberculosis, be deducted in the state and orders, then up to the age of 40 years the death-rates in state and convent are remarkably equal. From 40 to 60 years of age the death-rate due to non-infectious diseases is lower in the convent than in the state. In other words, it is clearly evident that the high mortality which obtains in these orders is due entirely to the infectious diseases, and more particularly to tuberculosis.

The following table shows the frequency of tuberculosis and other diseases in these convents, as compared with the whole of Prussia, in every hundred deaths, between the ages of 15 and over 70 years:

CAUSE OF DEATH.	15–20 YEARS.		20–25 YEARS.		25–30 YEARS.		30–40 YEARS.		40–50 YEARS.		50–60 YEARS.		60–70 YEARS.		70 YEARS.		TOTAL.	
	State.	Orders.	State.	Orders.	State.	Orders.	State.	Orders.	State.	Orders.	State.	Orders.	State.	Orders.	State.	Orders.	State.	Orders.
Tuberculosis............	37.8	60.8	43.0	67.4	43.5	73.7	39.3	73.8	32.7	57.9	26.8	28.6	17.8	19.0	3.25	11.3	23.7	62.89
Other diseases..........	62.1	39.1	56.9	32.5	56.4	26.3	60.6	26.1	67.2	42.0	73.1	71.3	82.1	81.0	96.7	88.6	76.2	37.11

From this table it is seen that, up to the age of 50 years, never less than one-half the deaths, but for the most part three-fourths (75 per cent.) of them, are due to tuberculosis. It is again shown that the deaths from tuberculosis in the nursing orders are much the most numerous between the ages of 25 and 40, just at the period of life when they are required to do the hardest work.

The following table shows the relation of the mortality to the length of residence in the convents and employment as sick nurses, divided into periods of five years each :

LENGTH OF RESIDENCE IN CONVENT.	MORTALITY FROM ALL CAUSES.	MORTALITY FROM TUBERCULOSIS.	MORTALITY FROM OTHER INFECTIOUS DISEASES.	MORTALITY FROM CANCER.	MORTALITY FROM OTHER DISEASES.
½ to 5 years...............	709	494 } 868	118	4	88
5 to 10 years...............	505	374	41	5	90
10 to 15 years...	300	210	23	9	67
15 to 20 years...............	197	133	21	9	43
20 to 25 years...............	134	53	18	10	63
25 to 30 years...............	94	27	11	3	56
30 to 35 years...............	49	7	9	6	33
35 to 40 years...............	31	5	3	2	23
40 to 45 years	35	8	1	..	25
45 to 50 years...............	16	2	1	1	13
50 to 55 years...............	14	..	..	..	14
55 to 60 years...............	6	1	..	..	5
Over 60 years...............	5	..	..	..	5

Cornet found that during the first half year of convent life the mortality was very low, but that afterward it rapidly increased, so that in the first five years, out of 709 deaths, 494 were due to tuberculosis ; and in the first ten years nearly twice as many (868 out of 1,214) died from this disease as succumbed to it in all the other years of convent life together. The highest mortality from tuberculosis was reached in the third year of the nurses' cloister life.

"It must strike every one as startling," remarks Heron, who quotes Cornet's statistics, "that in these convents we find communities recruited from amongst persons who, with very few exceptions, are certified by physicians to be in excellent health when they enter upon their convential duties, and that in from 16 to 18 years from that time these healthy young people will have reached the average limit of their lives. This enormous mortality, unequalled, I believe, amongst adults, owes its monster proportions to one cause above all others—tuberculosis."

Reference has already been made to the work which the novices and recent members of these orders are required to do ; namely, cleaning the wards, making the beds, washing the handkerchiefs and bed and body linen, etc., of the consumptive patients. "It is obvious," Heron says, "that amongst persons so occupied we should expect to find tubercular disease unusually frequent. These are the people most likely to come into intimate and frequent contact with a chief source of infection—the dried expectoration of consumptives. The principal insanitary condition of convent life is the living together of considerable numbers of persons who have not, from the nature of their calling, sufficient opportunities for open air exercise. It is impossible to believe, knowing what we do of the cause of tubercle, that such a condition of life could, of itself, produce tubercular disease. On the other hand, it would certainly lead to the rapid spread of that disease after it was introduced amongst such communities."

Finally, Dr. Heron, who carefully weighs the various questions as to the cause of tuberculosis, comes to the following conclusion : "Still, though infection is the only route by which tubercular diseases reach mankind, and beasts also, there does remain something of mystery, so it seems to me, around the fact that so many people, who are often exposed to the infection of tuberculosis through many years of their lives, never show a symptom of tubercular infection. The oft-quoted statistics of the Brompton Hospital, and my experience amongst my colleagues at the City of London Hospital for Diseases of the Chest, and my observations of the resident staff there, medical officers and nurses, have greatly impressed me with the fact, that it is not a trivial number of people who are often and closely associated with consumptives, and who escape infection by them. I cannot adequately explain this very interesting and important point. When, however, I turn to the bacteriology of tuberculosis, and to the statistics, for example, of the Catholic Nursing Orders of Prussia, the evidence strikes me as overwhelming in its force, and as leaving no escape from the solemn conclusion, that tuberculosis, in all its forms, results from infection alone, and that the only source of the infection, of which we have any knowledge, is found in the tubercular bodies of animals, both men and beasts."

Mortality Statistics from Tuberculosis in the University Polyclinic in Munich (Goldsmith and Luxenburger, Munch Med. Wochenshrift, September, 1896).

In 100 autopsies made in the above polyclinic during the year 1894–95, the following data were obtained:

Tuberculosis as cause of death in 44 cases.
Active phthisis in 12 cases.
Inactive phthisis in 24 cases.
No tubercular lesions in 20 cases.

Comparing the deaths from tuberculosis with the deaths from all causes, half of whom were autopsied, the following table is given:

YEAR.	TOTAL DEATHS FROM ALL CAUSES.	DEATHS FROM TUBERCULOSIS.
1893	131	63–48 per cent.
1894	141	71–50 per cent.
1895	152	77–50.6 per cent.

"This shows only too clearly the enormous death-rate from tuberculosis in this institution, as was confirmed by autopsy in many of the cases. Only 20 out of the post mortems made in 1895 were free from tuberculosis. Of the 80 persons affected with the disease 56 (70 per cent.) were seriously ill, and of these 44, or more than one-half of those affected died; and in 24 cases (30 per cent.) the previously existing tubercular processes were healed. It is stated that these figures rather under than over estimate the actual facts, as in these investigations extensive pleuritic growths were not reckoned as being tuberculous, except when they showed caseous formations in the lungs or corresponding lymphatic changes in the bronchial glands, etc.

"Such being the case, then, that among certain classes of people in Munich 80 per cent. are tuberculous, no one can deny that something should be done to prevent the spread of this disease."

The following table gives the average ages at death of those who died at this institution:

	AVERAGE AGE AT DEATH FROM TUBERCULOSIS.		AVERAGE AGE AT DEATH FROM OTHER CAUSES.	
	MALE.	FEMALE.	MALE.	FEMALE.
1893	42.4	35.8	59.5	56.8
1894	37.6	28.8	61.2	55.9
1895	37.0	33.6	56.0	60.0

"Can it be a mere coincidence," inquire these observers, "that the average duration of life of the tuberculous males is longer, both relatively and absolutely, than that of the tuberculous females; while with those who are not tuberculous this difference entirely disappears, or the reverse is the case. This we venture to deny. The true explanation of this striking circumstance is to be found in the fact that among the working classes, the men, owing to the character of their work as laborers, are afforded much greater opportunity to work in the open air than the women, and that they provide better food for themselves than the women obtain. In other diseases, such as heart and kidney diseases, joint affections, nervous disturbances, etc., these factors do not seem to play so important a part. If good food and fresh air, under such conditions, accidental and inadequate as they are, evidently have such a beneficial effect on tuberculous diseases, how much better results may we hope to get from the establishment of public hospitals for the proper treatment of consumptives."

The Influence of Occupation on the Liability to Tuberculosis.

It has long been recognized that the habits and occupations of people have an important influence in predisposing them to the disease. The following table has been prepared from statistics collected by Lindsay in his "Climatic Treatment of Consumption," quoted by Evans (Phthisiology), to illustrate the effect of occupations on the mortality from tuberculosis:

Occupation.	Mortality from Tuberculosis per 1,000 Deaths from all Causes.	Occupation.	Mortality from Tuberculosis per 1,000 Deaths from all Causes.
en	108	Earthenware workers	473
	167	Hosiery workers	168
	301	Cotton-mill operators	257
	461	Wool workers	272
	103	Quarrymen	308
rs	121	Cab and omnibus drivers	359
	371	Coal miners	126
kers	433		

om an examination of this table it will be seen that consumption is ıratively rare among those who live an outdoor life under normal ealthy conditions; that it is comparatively common among those live habitually indoors; and that it attains its maximum height g those whose occupation involves prolonged confinement in a d atmosphere.

ıe apparent exceptions to the law that the mortality from consump- s in direct ratio to the contaminaion of the air of respiration, admit, e most part, of a ready explanation. Thus quarrymen, although ng in the open air, have a high mortality; but here the inhalation ticles of stone dust, which is known to be one of the most powerful sposing causes of consumption, comes into play. Cab and omnibus s, also working in the open air, have a mortality rate from con- tion of 359 per 1,000 deaths; but they are proverbially an unhealthful in general, owing to their intemperance, exposure to wet weather, Again, coal miners are in an apparent exception to the rule, enjoying arative exemption from consumption, though engaged in work one might suppose would render them peculiarly liable to the se; but, as Lindsay remarks, this is probably due to the fact that ork is excessively laborious, and hence is usually chosen by those ıre free from hereditary tendency or acquired debility of any kind, ıat as their work requires the exertion of so much physical strength, relinquish it at the first signs of failing health, and, seeking some r occupation, are not tabulated as miners in the mortality statistics.

rsch, also quoted by Evans, gives the following data on this subject: "Summing up orn's inquiries, which were based in part on official statistics of the mortality, and in part pendent local researches into the death-rate from consumption in the manufacturing of England, Simon concludes as follows: 'In proportion as the male and female popula- re severally attached to indoor branches of industry, in such proportion, other things qual, their respective death-rates by lung diseases increased * * * and this further ive proof was given to the influence of an accused occupation, namely: That the high ıte from lung disease belonged, according to the occupation, to men or to women of the that it sometimes was nearly twice as high for the employed sex as for the unemployed l that it only extended to both sexes when both were engaged in the occupation.'"

mith has ascertained, for 1,000 persons treated for consumption at the Brompton Hospital, per cent. of them had been in the habit of spending their time in over-crowded, hot and laces indoors. Finkelnburg's summary of his inquiries into the causes of mortality in ı Prussia is as follows: The victims of pulmonary phthisis are the more numerous the nerally are indoor occupations followed by the one sex or the other, especially when the ls of their work are such as to create dust—wool-carding and spinning, knife-grinding and olishing are the most conspicuous. Wherever these occupations are found, among the rural population as well, there also the mortality from phthisis reaches a high figure, although never so high as in towns with the same industries. The same circumstances serve to account for the strikingly common occurrence of phthisis in nunneries, seminaries and such like institutions * * * also in the Oriental harems, not only among the women, but among the children also; again among badly lodged troops, of which we have evidence from England, France, Turkey and India, and, above all, in prisons."

Lagneau (mortality from tuberculosis following occupation, Revue de la Tuberculose, 1893, p. 88), compares numerous European statistics, and arrives at these results:

"1. The occupations which renders persons particularly predisposed to tuberculosis are those in which they are especially exposed to dust, as, for example, quarrymen, who, according to Swiss statistics, have a mortality of 10 per cent. from tuberculosis.

"2. Persons who, owing to their occupations, lead a sedentary mode of life, are more predisposed to tuberculosis than others. According to English statistics, students, young clergymen and others show a mortality of 459 deaths from tuberculosis per 1,000 deaths from all causes.

"3. Printers in England and Lithographers in Italy have a mortality of 300 to 400 per 1,000 deaths.

"4. On the other hand, those who live in the open air constantly have an almost complete immunity from consumption; such as shepherds, farmers and sailors; 1 to 2 per 1,000 only."

Lagneau has also investigated the influence of density of population on the death-rate from tuberculosis in cities.

In France, the statistics of 662 cities show that the denser the population the greater the number of deaths from tuberculosis.

The following table illustrates this fact:

Cities.	Deaths per 1,000
In 95 cities of less than 5,000 inhabitants	1.81
In 33 cities of less than 5,000 to 10,000 inhabitants	2.16
In 127 cities of less than 10,000 to 20,000 inhabitants	2.71
In 50 cities of less than 20,000 to 30,000 inhabitants	2.88
In 46 cities of less than 30,000 to 100,000 inhabitants	3.05
In 11 cities of less than 100,000 to 430,000 inhabitants	3.63
In Paris, 2,424,705 inhabitants	4.90

Some Evidences of Infection by Dust from Places Occupied by Tuberculous Persons.

Cornet (Zeitschrift f. Hyg., Vol. V., 1888) has chiefly studied the dust, and his article is so well known that it is only necessary to state here that out of 311 trials with the dust and dirt from places occupied by consumptives, 59 gave positive results; 77 trials made with the dust of other places were negative. Many other experimenters since Cornet have confirmed his observations. Reinbold (Central-bl. f. Bact u. Parasit., Vol. II., p. 199) and others, have found tubercle bacilli in the air of infected rooms. Spillman (Compt. Rendu. CV., '87, p. 352) and Hoffman (Central-bl. f. Bact. u. Parasit., Vol. IV., p. 269) have found that flies carry the germ in their intestines and deposit it in their droppings, and Hoffman, in one case out of four, found the bacilli in the intestines of flies virulent when inoculated into the eyes of rabbits. Stone (Amer. Jour. Med. Sci., March, 1891), has shown that the tubercle bacilli may be virulent in sputa after three years, during the last two of which it had been in a state of absolute dryness. Cadeac and Mallet (Congres pore l'Etude de la Tuberculose) found that the lungs of tuberculous cattle, dried and powdered, and then exposed to the air of a room, were virulent at the end of 102 days. A piece the size of the fist, dried and exposed to the air, infected at the end of 150 days; a similar piece, buried in a 3-litre flask filled with sand, was virulent at 159 days; also pieces in a flask of water, exposed to sunlight for 120 days, and others in running water for one month, were virulent (quoted by Jeffries, Boston Med. and Surg. Jour., Sept. 3, 1891).

Straus (Revue de la Tuberculose, 1896, p. 198), has found tubercle acilli in the nasal cavities of healthy persons exposed to infected areas. n 29 healthy individuals remaining in consumptive wards in a hospital or a greater or less period of time, 9 were found to have virulent bacilli n their nostrils. About one-fourth of all cases examined contained ubercle bacilli in the nasal cavities. This observation of Straus has been lso confirmed by others, as regards the nose. Lermoyez, Dieulafoy, tc., have found tubercle bacilli in the throats of healthy individuals xposed to infection.

Since the investigation of Villemin, Koch, Cornet and others, it is cknowledged generally that the dried sputum of consumptives contained n the dust of infected areas is the chief source of tubercular infection. The common form of the disease in man, namely, pulmonary consump-ion, would seem to indicate that, for the most part, infection was rought about by inhalation. These experiments now show, first, that irulent tubercle bacilli may penetrate and become lodged in the nasal avities and throats of healthy individuals, when exposed to contact for ny length of time to tuberculous patients, as in infected rooms or hos-ital wards; second, they demonstrate how numerous these germs are in he atmosphere of such places inhabited by consumptives; and third, hey prove that the common mode of communicating the disease is by he respiratory tract.

ome General Considerations of the Prevalence, Cause and Prevention of Tuberculosis.

Vaughan (Med. News, March 7, 1896), writing on the restriction of tuberculosis, says: "Of e 63,000,000 people living to-day in the United States, 9,000,000 or more will die of tuberculosis, nless something is done to prevent it. In the census of 1890, 102,199 deaths are reported as due pulmonary tuberculosis. To the reported deaths, not less than 30 per cent. should be added in rder to arrive at the actual number. When this computation is made, it will be found that the nnual number of deaths in this country from pulmonary tuberculosis amounts to nearly 133,000. * * In all probability the tubercle bacillus is directly or indirectly the cause of not ss than 150,000 deaths in this country each year."

"Leyden gives the ratio between annual deaths and the total number of infected persons 1 to 7. Williams states that the average life of the consumptives among the better-to-do classes England is 8 years. Accepting Leyden's estimate, we see that an average of 150,000 deaths nnually, indicates that the total number of persons in this country to-day infected with tubercu-sis amounts to 1,050,000, or 1 out of every 60 of the population. These figures are probably too nall. Germany has a population equal to about three-fourths that of this country, and Leyden ated before the International Congress of Hygiene and Demagraphy at Buda Pesth, last Sep-mber, that the number of consumptives in the German Empire is not less than 1,300,000, and the nnual deaths from this disease in the same country range from 170,000 to 180,000. It should be tated the figures given include only those cases in which tuberculosis progresses and causes death. The number of persons actually infected is indeed so large that one hesitates to give it. The ecords of the autopsies show that not less than one-third of all men have tuberculosis during some eriod of life.

"When the consumptive knows how, and properly attends to the thorough destruction of the germs thrown off from his body, there is no longer any danger of his becoming a centre of infection. Residence in a properly conducted hospital, arranged especially for the care and treatment of tuberculous patients, would be perfectly safe. The danger of infection in such a house would be much less than that to which the traveler subjects himself every time he passes a night in a hotel. * * * Wherever we go we are in danger of being infected, but if certain well-known rules should be followed in detail, the infected and the uninfected might mingle without danger. * * * Cornet has shown by positive demonstration that of all places examined by him where people congregate, the one most free from the chance of accidental infection is the properly equipped and kept surgical operating room. Here one is less liable to infection than he is in the open street, or in the best kept hotel, or in a private house.

"Frequently we hear it stated that only the weak and feeble acquire consumption, and the fittest survive. A more heartless, false and unscientific statement was never made. * * * While there are undoubtedly differences in susceptibility with little exposure, with no exposure the most feeble and unfit will not acquire tuberculosis, and with sufficient exposure there is probably none sufficiently robust to remain immune to this disease. * * * Mentone once had the reputation of being a most excellent place for the climatic treatment of consumption, but the invalid visitors coughed and expectorated on the streets and in the houses until the disease became fearfully prevalent among the native-born. The following quotation is from an article by Bennet, who practiced medicine at Mentone for many years, and who, at the time of writing this article, did not believe tuberculosis to be infectious: 'During the last few years phthisis has become much more common at Mentone among the girls and young women than it formerly was, especially among the washerwomen, a numerous class, and contagion from the linen soiled by the sputa of consumptives has been suggested as the cause. * * * When I first settled in this region in 1859, nearly the entire population was agriculturally occupied. All the young women of a village lying on a mountain side a few hundred feet above a property of mine were thus engaged, working at the soil with their fathers and brothers, carrying stones and earth in baskets on their heads. They were fine, healthy, robust girls and women, fed on macaroni, olive oil and wine, worthy to be the mothers of men. * * * Times have changed; the Grimaldi girls have all become town workers, washerwomen, seamstresses, servants, and they begin to die of consumption. Is it not because they work in close, badly ventilated damp rooms, instead of in the open air? Is it not again a question of rebreathed air, not of contagion?' * * *

"We are to restrict the disease by preventing the primary infection. How can this be done? Only in one way—by the destruction of the infecting agent. The places where the tubercle bacillus is found outside of the human body have already been enumerated. We must stop the sale of milk and meat from tuberculosis animals. * * * The greatest work must be done in the disinfection of the sputum and other germ-containing excretions from the human body. Much good can be accomplished by the circulars now being quite generally distributed by Boards of Health, but this agency is insufficient and incomplete. * * * I believe that every State should establish one or more hospitals for the education and treatment of its consumptives. * * * These hospitals should have a twofold use. The training of its inmates in methods of restricting the disease would be of untold benefit, and it is now generally conceded that the institutional treatment of the disease is the most successful. * * * But, says one, the experiment which you propose would be, if carried out, an expensive one. This is true, but is it not also true that we are paying heavy tribute to this plague at present? How much loss in money do the 150,000 annual deaths from this disease entail? * * * I will not attempt to name a money value of these lives. The question is above any financial considerations. It is one of the welfare of the human race. * * * In the plan which I propose, it would not be necessary for every consumptive to go to such a hospital, nor would it necessitate even the incurables remaining in these places indefinitely. The intelligent tubercular patient may live in intimate relations with his family, so soon as he knows and will practice the rules necessary to prevent infecting others. There is nothing cruel in the proposition which I make. On the other hand, it has everything to recommend it from a humane and even sentimental standpoint."

Ransome, in his Milroy Lectures on the Etiology and Prevention of Phthisis (Lancet, March 8, 1890), says: "Tuberculosis at the present day carries off, annually, nearly 70,000 persons (in England) in the form of phthisis, at the ages between 15 and 45, the most useful stages of human existence; it kills more than one-third of the people who die, and nearly half between 15 and 35. Moreover, in its prolonged and painful course, it either prevents its victims from earning a livelihood, or at least interferes greatly with their daily work. Its habit of seizing upon the flower of the population; its slow but almost certain progress toward death; the utter misery of the last few months or weeks of existence—all these are features in the fell disorder that render its study all-important, not only to medical men, but also to statesmen, and to all who are concerned with the welfare of the nation. Up to a recent period, not only was consumption supposed to be incurable, but it was also regarded as almost inevitable, and the fate of the consumptive patient himself was generally looked upon as hopeless. * * * But these views of the inevitable character and incurability of phthisis are now altered; for not only does clinical evidence show a considerable percentage of cure and improvement, under judicious treatment, but the evidence derived from the post mortem examination of adults who have died from diseases other than phthisis shows that a very large percentage of persons have suffered and have recovered from tubercular disease of the lungs. With regard to the prevention of the disease, still less can any doubt prevail; during the last thirty years the returns of the Registrar General show that the annual death-rate from phthisis has been reduced by more than one-third. This improvement, which is not confined to England, is too large to credit to the greater accuracy in diagnosis; it is attributable to the prevention of phthsis by improved hygiene. The records of the mortality of the British army and navy furnish evidence of the strongest kind of the influence of sanitary measures preventative of consumption, and Dr. Buchanan has shown that good drainage of a locality may diminish by one-half the prevalence of the disease." * * *

"Few medical men who have been long in practice will doubt the existence of family predisposition to tubercular disease. Most of us have seen instances in which almost every member of a family have died of tuberculosis, and in other cases members of the same family living in different places have most of them ultimately succumbed to it. Yet it is quite possible to make too much of this influence, and when we consult the statistics that have been put together on the subject, we find great differences in the results given by different observers, and in the figures no account is taken of the external circumstances, sources of infection from without, that are common to all members of the family. Again, since nearly half of all the deaths between the marriageable ages, from 15 to 35, are due to this cause, there would be nothing surprising in the fact that half of the consumptive patients have had consumptive relatives, unless the families were unusually large; and if we draw grandparents and collateral relatives into the statistical net, it breaks at once, and holds no solid conclusion. It is highly probable that heredity has less to do with consumptives than is commonly supposed; we must ascribe to it a much smaller influence than is usually given."

"There are four possible modes of infection by the tubercle bacillus: It may gain access to the interior by the skin, the generative organs, the digestive tract and the lungs. The few exceptional recorded cases of inoculation by the skin only serve to show the rarity of the occurrence. Infection by means of marital intercourse is also probably very uncommon. Tuberculosis has been produced in animals by feeding them with tuberculous material, and the question as to the suitability for food of the flesh of tuberculous animals is undoubtedly one of enormous importance. * * * The evidence as to the transmissibility of tubercle by the ingestion of milk from tuberculous animals is much more distinct and positive even when there was no evidence of general infection in the beasts. * * * But there are certain broad considerations which should, I think, prevent us from attributing much of the phthisis that prevails to either source of infection (meat or milk). The poor, who mostly suffer, very rarely take meat, and they prefer it over-cooked rather than under-done; butchers and cooks who suffer from tapeworm from picking at raw meat, are less liable than others to phthisis. The Hindoos, who abjure meat of oxen, are as subject to phthisis as other races; and the Guanchos, of South America, who subsist almost entirely upon beef, are remarkably free from the disease. So, too, the poor denizens of our towns are often unable to procure milk, though when they do get it it is more likely to be obtained from diseased animals, and also more open to contamination by tuberculous dust in the small milk shops in which it is stored. The comparative rarity of the disease among the children of the rich, who consume it largely, and who will very seldom take it after it has been boiled, shows that the danger from this source is not quite so serious as it has lately been represented to be both in this country and abroad. * * * The next medium through which the bacilli may be conveyed is the air. There is but little certain proof of the contagiousness of phthisis from mouth to mouth. * * * It is well known that Koch regards the dissemination of phthisis by means of dust as the most common way in which this disease is produced, by the drying up and pulverization of matter expectorated upon the ground, or on the floors of dwellings, or on the handkerchiefs. This view was taken long before the discovery of the tubercle bacillus, and it would account for most of the cases of supposed direct infection that have been recorded. * * *

"If all the suggestions that have been made (inspection of meat, milk, building of sanitary dwellings, disinfection of sputa, etc.), were carried into effect, we might fairly hope that in a few years there would be a considerable reduction of the phthisis death-rate; but in spite of preventive efforts there would remain a large number of persons suffering from the disease, and it would become a serious question for the public and for the State, whether such persons, if they are without proper lodging and accommodation for preventing infection, should not be provided with asylums or hospitals until the disease is either cured or ends in death. Enormous sums have been spent in the past in the isolation of leprosy, which is less easy to control by such a method; and if a country like Norway can provide asylums for a large population of its lepers, it is not too much to ask Great Britain to make the attempt to segregate those consumptives who are likely to be a source of danger to the community. * * * Although phthisis is not directly contagious, I venture to contend that there would be nothing unreasonable in thus classing it; for it is strictly analogous to enteric fever. I would class phthisis with other infective disorders, so that every case, as soon as it is discovered, should be notified to the medical officers of health. * * * When the patient becomes unable to follow his employment, he should be offered such an asylum as a workhouse or hospital, which should be made as little humiliating and free from ignominy as possible. When such a hospital is effectively administered, there could be probably no better fate in store for the poor invalid who might even be restored to his family, and be able to return to his work. For patients not reduced to pauperism, male and female wards might be constructed in connection with the hospital for infectious diseases, and there is still a wide field open to private benevolence in the provision of sanitariums or houses for these unfortunates."

THE IMPORTANCE OF SPECIAL HOSPITALS FOR THE CONSUMPTIVE POOR.

Hon. CHARLES G. WILSON,
President :

SIR—I have the honor to transmit herewith for your consideration a communication issued from the Imperial Office for Health, of Germany, on the importance of establishing special hospitals for the treatment of pulmonary tuberculosis.

Very respectfully,
HERMANN M. BIGGS, M. D.

A Contribution to the Determination of the Utility of Special Hospitals for Consumptives.

(From the *Kaiserliches Gesundheitsamt.*)

Tuberculosis has long been accorded a rank of supreme importance among the diseases which threaten human life, and especially so since it became known that the term included all forms of the disease, and scrofula as well as consumption. This importance increases immensely when we take into account the question of age—that is to say, when leaving out of consideration the peculiar conditions of childhood and old age, we study the mortality from tuberculosis between the ages of 15 and 60; for the disease makes its greatest ravages among the laboring classes of the population.

Statistics as to age mortality, upon which such special investigation could be based, have only been accessible in Germany within comparatively recent years. As the result of an inquiry into this subject, the following figures have been deduced. According to the official returns for the year 1893, the latest period for which these dates are accurately given, out of a total of 268,500 persons dying between the ages of 15 and 60, of whom the cause of death was reported, 88,654 died from tuberculosis—a mortality of 33 per cent. for these ages.

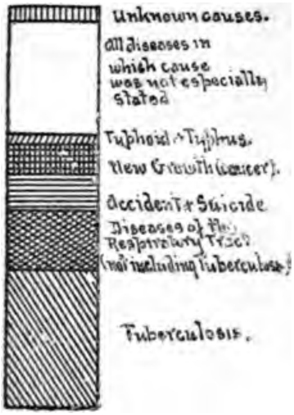
Including deaths from unknown causes, the total number of deaths was 275,094. As these returns include only 94 per cent. of the total population, the actual number of deaths was probably 292,650 of those dying between the ages of 15 and 60, of whom 94,300 died from tuberculosis, and 90,800 from phthisis pulmonalis. This proportion of 33 to 100 was not the same for all parts of the empire; in East Prussia the mortality percentage was 22, whereas in parts of Bavaria it was 43 per cent. Whether this difference in mortality was due to the mode of life of the people, locality, etc., was not definitely determined. But at all events, it was found that those living in the northeastern parts of Germany had a lower mortality per 1,000 from tuberculosis in these ages than those inhabiting the western and more densely populated districts. The fact of living in the high lands does not seem to have any important effect on the death-rate from tuberculosis, as this was greater in several districts situated higher above the sea level, as for instance, in Upper Bavaria and the Black Forest, than in any low-lying districts.

The high mortality rate from tuberculosis for the ages between 15 and 60 in the year 1893 is no exception to the rule, as is shown by the mortality in previous years. The following figures give the deaths from tuberculosis for the ages between 15 and 60 in the kingdom of Prussia for the five years, 1889 to 1893, inclusive:

YEAR.	DEATHS.	DEATHS FROM TUBERCULOSIS PER 1,000 DEATHS FROM ALL CAUSES.
1889	57,712	358
1890	59,300	346
1891	56,083	341
1892	53,015	317
1893	54,727	313

It is seen, therefore, that during the great epidemic of influenza, 1889-90, the mortality from tuberculosis was greater than in 1893.

The following sketch and statistics illustrate how very insignificant are all other causes of death in comparison with tuberculosis between the ages of 15 and 60:



CAUSE OF DEATH BETWEEN 15 AND 60.	TOTAL DEATHS.	DEATHS PER 1,000 DEATHS FROM ALL CAUSES.
Tuberculosis	88,654	322.3
Pneumonia	25,144	91.4
Other diseases of the respiratory tract	17,879	65.0
Suicide and accident	17,843	64.9
New growths (cancer)	15,284	55.6
Typhoid and typhus	4,948	18.0
Unknown causes	6,632	24.1
Total from all causes, including unknown causes	275,094	1,000

From this it appears that not only such important causes of death as typhoid fever and the much dreaded cancer, but pneumonia and deaths from violence, suicide and accident, are all overshadowed by tuberculosis.

In view of these recent statistics, founded upon indubitable facts, the question forces itself upon the minds of every one who has the welfare of the people at heart, by what means the ravages of this disease can be checked, which threatens more particularly the lives of the working classes.

That it is possible, in many instances, in otherwise healthy subjects, to conduct a case of tuberculosis to a favorable termination, or at least to stay its progress, has been amply shown by the results of scientific investigation.

It is a fact well known to experienced pathological anatomists, as the result of numerous autopsies, that evidence is often given of healed tuberculous processes; that not only more than one-half of all those who die show on examination the old scars of tubercular lesions, but also that even those who have died of diseases other than tuberculosis, or in the full bloom of health from sudden death by accident or suicide, often show these scars lesions.

According to trustworthy authorities, such healed tubercular foci, encapulated or calcified, are found in every third or fourth body examined. These have not been the cause of death, and, on the contrary, have apparently not affected to any extent during life the functions of the organs attacked. One renowned university professor expresses the opinion, from his own experience, that *healed* tubercular lesions may be found in 14 per cent. of all those who have died having given no physical signs of phthisis during life, and that this is a low estimate of the actual number.

Another celebrated teacher of pathological anatomy, in an article recently published, says: "Relative recoveries from tuberculosis are frequent."

But it is not only the pathologists who have come to the conviction, from their observation, that it is possible to check the tubercular process; many other physicians, who a few years ago considered tuberculosis to be an incurable disease, have now come to regard it in a much more hopeful light.

Aside from the possibility of removing, by surgical means, the localized tubercular foci, the hygienic and dietic treatment of consumption, which is by far the most common form of the disease, and the systematic education of patients to live in a manner necessary to health, has undoubtedly led to the most satisfactory results.

In the Sanitoria of Görbersdorf and Falkenstein, which have been established for more than twenty years, many tuberculous cases have been treated and hundreds have been fully, and often permanently, restored to health, when the treatment was begun early enough and conscientiously carried out.

Among the proofs to be found in the medical literature of the day is the list published by Koeniger, giving the number of persons who are known to have recovered from tuberculosis, and who have been since followed up and seen in positions of active work years after they were treated and discharged from "The Home for Invalids and Aged" in Hanover. Out of 591 persons received for treatment for tuberculosis in that institution, 248 were, at the time of the communication, still under treatment, and 343 had been discharged. Of these, 200 were dismissed as well, or improved (considerably improved), giving a percentage of 58.3 recoveries.

Dr. Liebe (Hygienische Rundschau No. 17, 1895), gives the following statistics, as the result of the treatment in public sanatoria. Of 128 patients admitted during six months into a Hanseatic Institute, 90 were under treatment toward the end of the first year, 26 were fully restored to health and able to return to work, and 12 were considerably improved. From the reports of such institutions, Dr. Liebe deduces the following estimate: That of 81 patients discharged after nine months' treatment, 36 would be able to return to work (or 44 per cent.), 26 would be able to do light work (or 32 per cent.), while 19 would not be sufficiently recovered to do any work, and 12 would become worse or die.

In order to show that the results obtained in these institutions were not temporary, but in many cases permanent, the following figures have been published by the management of the Hanseatic Hospitals for invalids and aged persons: From March, 1894, to June, 1895, in all, 226 patients were discharged; 51 (or 22.6 per cent.) were classified as entirely cured; 104 (or 46 per cent.) as being able to return to work; 41 as being able to do only light work; and 30 were classified as without result. Later inquiries made in regard to those who were considered cured or able to return to work, received a definite reply from 98. In 17 cases the answer was unfavorable—that is to say, the progress made in the sanitarium was again lost; but in 81 cases (more than four-fifths of those from whom replies were received) the result was permanent.

Such experiments as these warrant us in hoping for good results from the treatment of tuberculosis in public sanitoria; that the patients in such institutions receive sufficient care and attention to produce the desired result is proved by statistics.

Of course it would be necessary in such institutions to separate those patients who are suffering from an advanced stage of the disease, and who are, so far as treatment is concerned, beyond human aid, from those with incipient tuberculosis, and for whom there is still some chance of recovery. All possible effort should also be exerted to persuade those who are admitted for treatment to submit readily and willingly to the measures prescribed; they should be encouraged and cheered, and taught to appreciate the necessity for carrying out faithfully the instructions given for their recovery.

If this is done, then these hospitals will not only assist in restoring many sick and suffering to full health or ability to return to work, but they will be of extended benefit to the families and fellow laborers of all those treated. While there is danger of infection, the tuberculous persons will be isolated, and when they come out of the hospitals they will have learned how to keep themselves in a condition of health, and if a relapse should occur, they will know how to protect their children and others around them from the danger of infection by this fatal disease.

Some estimate may be made of the financial benefit which such public hospitals for consumptives would bring to the people by the following calculations: Assuming that only one-seventh or one-eighth of the 90,800 persons between the ages of 15 and 60 who die annually in Germany from tuberculosis—or, in round numbers, 12,000—were subjected to treatment, and that of these three-fourths, or 9,000, were restored to health or ability to work, and thus remained alive and with their families for three years longer than would be otherwise possible; and estimating the wages of a man (in Germany) to be 600 marks ($150) a year, or say an average of 500 marks ($125) for each person between the ages of 15 and 60, then there would be a total gain of 3 × 500 × 9,000 equals thirteen and one-half million marks ($3,375,000) for those who were thus benefited. To do this would require an expenditure, say, of 400 marks ($100 for each of the 12,000 persons treated, without deducting interest on plant, or a total cost of about five million marks ($1,250,000). If now the interest on the estimated capital necessary to maintain 4,000 beds be added to this, or one million marks ($250,000) more, there would remain, after subtracting the total cost of six million marks ($1,500,000) for the annual treatment of 12,000 patients, a total yearly gain to the public of seven and one-half million marks, or ($1,875,000). To this should be added the profit to the patients themselves in the pleasure of living, and the protection afforded to the children and families of those restored to health, to whom are thus preserved the support of the working father or care of the devoted mother for perhaps many years to come.

It is moreover to be considered that by this treatment in special hospitals a more wholesome and sanitary mode of living would be more and more cultivated, particularly among that class of the population which is always most neglectful in this respect.

Finally, as the treatment of incipient tuberculosis continues to progress, the number of those suffering from the advanced stages of phthisis would gradually become less and less, until in time the disease would be only rare, if it were not entirely stamped out.

There is no work which can be undertaken which is so humane, and at the same time so profitable, as the establishment of special hospitals for consumptives.

The following table gives the deaths from tuberculosis and consumption, per 1,000 deaths from all causes, for Germany, England, France, Austria and Belgium, arranged according to age and compared with one another:

Mortality from Tubercular Diseases and Phthisis, per 1,000 Deaths from all Causes, According to Age.

COUNTRIES.	CAUSE OF DEATH.	YEAR.	DEATHS FROM TUBERCULOSIS, PER 1,000 DEATHS FROM ALL CAUSES, ACCORDING TO AGE.				DEATHS FROM TUBERCULOSIS, PER 1,000 DEATHS FROM ALL CAUSES, BETWEEN THE AGES OF 15 AND 60.				
			0-1	1-15	15-60	Over 60	15-20	20-30	30-40	40-50	50-60
German Empire.	Tubercular diseases	1892-93	10.7	65.6	321.7	61.7	....	....	....	....	....
	Phthisis alone.....	1892-93	7.1	45.0	288.3	55.8	....	....	....	....	....
Prussia..........	Tubercular diseases	1892-93	10.6	53.6	315.1	60.9	....	....	....	....	....
	Phthisis alone.....	1892-93	8.8	45.1	305.7	68.4	....	....	....	....	....
	Tubercular diseases	1886-93	10.6	55.7	343.7	84.3	411.4	449.5	396.8	318.4	242.6
Berlin.............	Tubercular diseases	1892-93	14.7	78.4	338.0	53.6	....	....	....	....	....
Bavaria	Tubercular diseases	1892-93	12.6	113.7	359.3	54.5	....	....	....	....	....
	Tubercular diseases	1888-92	11.7	112.9	371.6	59.7	496.0	552.8	455.3	338.4	220.0
Austria—Vienna.	Tubercular diseases	1891-92	46.8	230.0	459.0	*93.5	624.6	643.0	540.9	386.2	233.2
	Phthisis alone.....	1891-92	40.1	171.5	427.4	*88.2	574.9	507.6	505.3	361.6	217.1
Prague............	Tubercular diseases	1888-89	5.2	109.1	421.0	*95.9	569.2	566.1	492.5	326.6	248.6
Belgium — Brussels...........	Tubercular diseases	1885-94	45.3	196.5	371.2	28.0	465.9	529.9	491.3	334.0	169.2
	Phthisis alone.....	1885-94	6.0	51.5	364.7	27.4	442.7	520.9	484.7	327.6	167.7
			0-1	1-19	20-60	Over 60	20-40	....	....	40-60	....
France—Cities over 30,000 population....	Tubercular diseases	1892-94	23.1	195.8	318.8	31.9	448.3	....	....	215.2	....
	Phthisis alone......	1892-94	6.3	111.7	279.3	25.7	393.6	....	....	187.9	....
Paris...........	Tubercular diseases	1892-94	31.8	231.9	400.7	46.9	544.2	....	....	287.2	....
	Phthisis alone......	1892-94	9.1	126.8	369.9	43.3	502.2	....	....	255.2	....
			0-1	1-15	15-65	Over 65	15-20	20-35	35-55	55-65	....
England	Tubercular diseases	1885-93	32.1	101.9	223.4	12.4	378.2	390.4	211.4	66.8	....
	Phthisis alone.....	1885-93	5.1	35.1	213.1	11.7	335.2	372.2	205.2	64.5	....

* Deaths at unknown ages also are included with these in Austria.

The following tables have been prepared by Dr. A. R. Guerard, Assistant Bacteriologist, to illustrate further the facts regarding the mortality from tuberculosis at different ages:

TABLE I.

Mortality from Tubercular Diseases and Phthisis, per 1,000 Deaths from all Causes, According to Age, in New York City.

CAUSE OF DEATH.	YEAR.	DEATHS FROM TUBERCULOSIS, PER 1,000 DEATHS FROM ALL CAUSES, ACCORDING TO AGE.				DEATHS FROM TUBERCULOSIS, PER 1,000 DEATHS FROM ALL CAUSES, BETWEEN THE AGES OF 15 AND 65.			
		0-1.	1-15.	15-65.	Over 65.	15-20.	20-35.	35-55.	55-65.
Tubercular diseases......................	1892-93	39.0	74.2	241.2	48.8	354.0	354.8	204.3	02.0
Phthisis alone..........................	1892-93	5.4	22.7	230.7	48.1	321.5	338.6	197.9	88.3
Tubercular diseases......................	1895-96	30.6	80.8	253.7	46.8	387.2	379.4	216.8	94.5
Phthisis alone..........................	1895-96	4.2	20.2	244.1	45.6	340.3	365.9	210.6	92.3

TABLE II.

Death Rates from Tubercular Diseases and Phthisis, per 1,000 *Population, in* 1893 *and* 1896, *Showing the Percentage of Decrease in the Mortality from these Diseases in Three Years, in New York City.*

YEAR.	POPULATION.	DEATH-RATES FROM TUBERCULAR DISEASES.	DEATH-RATES FROM PHTHISIS.
1893	1,758,010	3.51	2.91
1896	1,934,077	3.06	2.58
Decrease in mortality in three years	....	12.8%	11.3%

TABLE III—SUMMARY.

Mortality from Tubercular Diseases, per 1,000 *Deaths from all Causes, Between the Ages of* 15 *and* 60 *Years, in Germany, Prussia, Bavaria, France and England.*

COUNTRIES.	YEAR.	DEATHS FROM TUBERCULAR DISEASES, PER 1,000 DEATHS FROM ALL CAUSES, BETWEEN THE AGES OF 15 AND 60.
German Empire	1892–93	321.7
Prussia	1892–93	315.1
Bavaria	1892–93	359.3
France	1892–94	318.8
England	1885–93	223.4 (15 to 65 years.)

TABLE IV—SUMMARY.

Mortality from Tubercular Diseases, per 1,000 *Deaths from all Causes, Between the Ages of* 15 *and* 60 *Years, in Berlin, Vienna, Prague, Paris, Brussels and New York.*

COUNTRIES.	YEAR.	DEATHS FROM TUBERCULAR DISEASES, PER 1,000 DEATHS FROM ALL CAUSES, BETWEEN THE AGES OF 15 AND 60.
Berlin	1892–93	338.0
Vienna	1891–92	459.0
Prague	1888–89	421.0
Paris	1892–94	400.7
Brussels	1885–94	371.2
New York	1895–96	253.7 (15 to 65 years.)

SOME INVESTIGATIONS AS TO THE VIRULENCE OF THE DIPHTHERIA BACILLI OCCASIONALLY FOUND IN THE THROAT SECRETIONS IN CASES PRESENTING THE CLINICAL FEATURES OF SIMPLE ACUTE ANGINA.

BY

HERMANN M. BIGGS, M. D.,

Pathologist and Director of the Bacteriological Laboratories.

It is very difficult to dislodge from the minds of most practitioners of medicine the purely anatomical conception of diphtheria. Up to the period beginning with the discovery of the Klebs-Loeffler bacillus and the development of the methods of bacteriological examination in the diagnosis of this disease, diphtheria was generally regarded as an inflammation of the respiratory mucous membrane, characterized by the formation of a false membrane, and this false membrane was considered to be the diagnostic feature of the disease.

Notwithstanding that previous clinical experience had shown that this was not a reliable criterion for the diagnosis of diphtheria, and notwithstanding that the evidence derived from thousands of bacteriological examinations in acute throat affections has demonstrated the fallacy of this view, there still remains the firm belief with a large proportion of the profession that only such cases of acute angina are to be regarded as diphtheria as present at some time in their course more or less membrane. So thoroughly has this idea become fixed, and so strong is its influence upon practice, that many even of those physicians who unhesitatingly accept the Klebs-Loeffler bacillus as the essential cause of diphtheria are still guided by it in their sanitary treatment of cases of true diphtheria which simulate simple angina, and they do not regard the isolation and subsequent observation of such cases as either necessary or advisable.

Physicians readily enough acquiesce in the isolation of cases of mild scarlatina or variola until complete desquamation has occurred, and no question arises as to the danger of transmission of such diseases to other persons through contact with mild forms, but similar reasoning is not allowed to apply to diphtheria.

The observations of Roux, Koplik, Park and others long ago proved that simple catarrhal angina, or what seemed to be clinically simple catarrhal angina, might be caused by the diphtheria bacillus. This fact was clearly brought out in an admirable paper by Koplik, published in 1892. Long before this time Trousseau, Jacobi and other clinicians had shown that frequently during epidemics of diphtheria clinical anginas occur, which are as prostrating as those associated with the formation of membrane; and, in 1890, Roux directed attention to the fact that such cases, or very mild forms of angina without subsequent prostration, were not infrequently the origin of severe epidemics of diphtheria. The investigations of many observers, on the other hand, have proven that the presence of membrane does not necessarily indicate the existence of diphtheria, as membraneous inflammations of the throat may be produced by other organisms than the diphtheria bacillus.

The purpose of the series of investigations detailed in this paper was to fix the exact value to be attached to the ordinary routine bacteriological examinations in determining the true character of the cases described. It was desired to ascertain in how large a proportion of the cases of simple acute angina the diphtheria bacilli would prove to be virulent in animal tests when they appeared to be typical in form and staining. Previous experience had led us to believe that the bacilli in such cases were almost invariably fully virulent.

The cultures selected for the observations were chosen from those received at the New York Health Department laboratories, in which diphtheria bacilli were apparently found on microscopical examination, and in which the physician's diagnosis was doubtful or was tonsilitis. In some instances the diagnosis accompanying the cultures was simply tonsilitis; in others it was follicular, ulcerative, membranous or pseudo-diphtheritic tonsilitis, or pseudo-diphtheria, or acute pharyngitis, or diphtheria with an interrogation point. When cultures were received that had some such diagnosis as those referred to, and microscopical examination showed that they contained apparently typical diphtheria bacilli, the bacilli were plated out, pure cultures obtained, and their virulence then tested upon guinea-pigs in the usual manner.

The bacilli derived from cultures made from 48 cases of this type were tested, and in only 3 instances were the organisms found to be non-virulent. I may say, in passing, that before the virulence of any culture was tested, the character of the bacteria present in it was usually passed on by Dr. John S. Billings, Jr., and Mr. Alfred L. Beebe, who commonly made the routine examinations, and Dr. William H. Park and Dr. Anna L. Williams, who plated out the cultures and tested the bacilli for virulence. All these persons have had a very large experience in bacteriological work connected with diphtheria, and it will be readily understood that many cultures were thrown out as not showing typical Loeffler bacilli, although they would be generally regarded as such. The subsequent history of the cases was obtained from the attending physicians by inspectors of the Health Department, and inquiry was made in each instance as to the source of infection, and as to the occurrence of other cases in the family.

In 4 of the 48 cases the subsequent history could not be obtained. Of the remaining 44, 14 presented throughout their illness the clinical features of typical acute follicular tonsilitis, and in all of these the reports showed that the cases were of a mild character, and convalescence was fully established in from three to five days. In three instances the course of the disease was that of a simple acute pharyngitis of a mild type. In none of these 17 cases was there any membrane in the throat at any time during the illness, and nothing in the clinical history suggested diphtheria. In a number of them the original cultures were sent by the physician in attendance, because one or more cases of diphtheria had already occurred in the family or in the institutions in which the patients were inmates, and in others the cultures were sent as a matter of routine, as is frequently done by many physicians in New York City. In one additional case, the early history was that of a follicular tonsilitis, from which the child was apparently convalescent, when suddenly croup developed with laryngeal stenosis, and intubation was required; in another, the history was that of a follicular tonsilitis, excepting that after three or four days' illness the child became hoarse and had a croupy cough. No antitoxin was administered, however, and the patient soon recovered. In the remaining 25 cases, while originally the diagnosis by the attending physician was follicular tonsilitis or was considered to be doubtful, ultimately membrane appeared, and the course of the disease, finally, was that of a more or less severe diphtheria.

Excluding the 25 cases in which, ultimately, the patients developed characteristic symptoms of diphtheria, there remain the 19 cases which were clinically follicular tonsilitis or pharyngitis, with, in two instances, the development late of some laryngeal symptoms. In 17 of these the tests upon animals showed that the bacilli found in the cultures were fully virulent.

In the analysis of this series of 19 cases of apparently simple angina, associated with the presence of the Loeffler bacillus as to the history of contagion, it was found that 4 occurred among the inmates of various institutions for children in which diphtheria was at the time prevailing. In 6 of the remaining there was a history of previous or subsequent cases in the family, or the child was known to have been in contact with some person suffering from diphtheria. The history on this point in four cases was not given. It will be seen, therefore, that in 10 out of 15 in which the history was obtained there was reasonable evidence of contagion.

Examination was also made of the records in these 19 cases to show the duration of persistence of the Loeffler bacillus. This could be determined in 15 of the series. The Loeffler bacilli had disappeared in most of these cases within eight days of the time of the first culture. In one instance, however, they persisted for twelve days, in another for eighteen, and in another for thirty days. No subsequent tests for virulence were made during the persistence of the bacilli.

An important question arises in this connection as to the frequency with which true diphtheria simulates simple angina. There are no data at the command of the Health Department in New York which throw any light upon this phase of the subject. It has been found, however, that where virulent diphtheria bacilli are present in normal throats, as a rule, the history will disclose some recent exposure to diphtheria, and in a majority of the cases here described investigation proved that there was a definite source for the contagion.

From April 1 to 28, notes were made of the clinical and bacteriological diagnosis in every case from which cultures were received in the New York municipal laboratories. The number of cultures examined was much smaller during April than during some of the winter months. For this period, however, 2,042 cultures were examined. Of these, 915 were primary, 944 were secondary, and 183 were trial cultures—that is, were made from the healthy throats of persons who had been in contact with diphtheria. Of the 915 primary cultures, about one-half, 450, were made by the attending physicians. The clinical diagnoses accompanying the slips in these cultures were as follows: In 54 cases, false diphtheria (usually tonsillitis); in 145, diphtheria or croup; and in 241 the diagnosis was doubtful or blank. The result of the bacteriological examination was as follows: False diphtheria, 110, in contrast with 54 diagnosticated as such; true diphtheria, 239, in contrast with 145 diagnosticated as such; and 241 in which the diagnosis was doubtful or blank. In 91 cases the bacteriological diagnosis was doubtful, either because the cultures were made too late in the disease, or were contaminated, or were unsatisfactory for some other reason. It therefore appears that out of 450 primary cultures received from physicians from April 1 to 28, inclusive, only 239, a little more than half, proved to be true diphtheria. During this same period there were reported to the Department, as diphtheria, 107 cases in which no cultures were made by the attending physicians, but those later made by the inspectors of the Department, on bacteriological examination, showed no diphtheria bacilli, and the cases were therefore declared to be false diphtheria.

These data dispose of the statement which has been so constantly made and reiterated, that, as the result of the general adoption of bacteriological examinations for the diagnosis of diphtheria, the total number of cases of this disease have been largely increased by the addition of many cases of tonsilitis and pharyngitis which were previously regarded as simple anginas. As will be seen during the period referred to, 107 cases considered as diphtheria, and reported as such to the Health Department, were excluded from the lists of reported cases of diphtheria by the bacteriological examination. During this same period only 80 cases considered by the physicians to be false diphtheria, or of a doubtful nature, were found, on bacteriological examination, to be true diphtheria.

There are no data at hand to show the exact proportion of cases reported as follicular tonsilitis which, on bacteriological examination, prove to be true diphtheria. The proportion, however, is small.

A large number of cultures is sent to the Department in which no clinical diagnosis is given. Some of these prove to be cases of true diphtheria and some false. Whether they present the clinical features of diphtheria, the Department has no means of ascertaining. Comparatively few physicians, however, send cultures from cases showing only the symptoms of follicular tonsilitis, unless there are some reasons for suspecting the affection to be of a diphtheritic character.

The observations made on the cases detailed in this paper, while not very numerous, yet when
ken in connection with those previously made in the Health Department laboratories, and the
servations of Koplik and others, are sufficiently conclusive in showing that when diphtheria
acilli typical in appearance are found in cultures obtained from cases of simple angina (cases in
hich there is no membrane), animal tests, in a large majority of instances, prove that the bacilli
e fully virulent. In other words, when morphologically typical diphtheria bacilli are found in
ltures made after the rather rude methods employed in diagnostic work, the result of the exam-
ations may be generally accepted as indicating the existence of virulent diphtheria, unless animal
sts have shown the organisms to be non-virulent.

We may refer, in conclusion, to the following classes of cases :

First—The healthy throats in which diphtheria bacilli are present. In these, investigation
most always shows that the individuals have been in contact with cases of diphtheria. The
esence of the bacilli in the throat without any lesions does not, of course, indicate the existence
the disease.

Second—The simple anginas in which virulent diphtheria bacilli are found. These are to be
garded, from a sanitary standpoint, in exactly the same way as cases of true diphtheria.

Third—Cases of true diphtheria presenting the ordinary clinical features of diphtheria and
owing the Loeffler bacilli.

Fourth—Cases of angina associated with the production of membrane in which no diphtheria
cilli are found. These might be regarded, from a clinical standpoint, as diphtheria, but bacter-
logical examination shows that some other organism than the Loeffler bacillus is the cause of the
ocess.

It may be urged that the cases described in this paper were possibly instances of streptococcus
flammation of the throat, in which diphtheria bacilli chanced to be present in the throat secretions,
d were only accidental accompaniments and not the cause of the inflammation.

This inference does not appear to be justified, and the only excuse for it would seem to be the
sire to retain the anatomical conception of diphtheria, *i.e.*, that it is always an inflammation
sociated with the formation of a false membrane. It is this conception which I particularly wish
combat, and I desire especially to emphasize the statement that all inflammations of mucous
embranes, due wholly or in part to the Klebs-Loeffler bacillus, should be included under the
me diphtheria, without reference to the site or extent or intensity of the inflammatory process,
the character of the exudate.

No.	DATE.	PHYSICIANS' DIAGNOSIS ACCOMPANYING CULTURES.	RESULT OF BACTERIOLOGICAL EXAMINATION.	RESULT OF ANIMAL INOCULATION.
1	....	Follicular tonsilitis	Typical diphtheria bacilli	Virulent
2	....	"	"	"
3	1896. Jan. 7	Diphtheria (?)	Many suspicious bacilli; a few typical diphtheria bacilli	"
4	" 9	Ulcerative tonsilitis	Typical diphtheria bacilli	"
5	" 9	Diphtheria (?)	"	"
6	" 13	Membraneons tonsilitis	"	"
7	" 13	"	"	"
8	" 14	Diphtheria (?)	Many very suspicious bacilli; a few typical diphtheria bacilli	"
9	" 16	"	Typical diphtheria bacilli	"
10	" 16	Tonsilitis	"	"
11	" 18	"	"	"
12	" 19	Follicular tonsilitis	"	"
13	" 19	Pseudo-diphtheria	"	"
14	" 20	Follicular tonsilitis; possibly diphtheria	Extremely small diphtheria (?) bacilli	"
15	" 19	Tonsilitis	Small, rather typical bacilli	Non-virulent
16	" 22	Doubtful.	Large, pointed diphtheria (?) bacilli	Virulent
17	" 22	Suspected diphtheria	Very small typical diphtheria bacilli	"
18	" 25	Tonsilitis	A few large, fairly typical bacilli	"
19	" 26	Follicular tonsilitis	Small number of fairly typical bacilli	"
20	" 27	Measles	Typical diphtheria bacilli	"
21	" 27	Nasal Diphtheria (?)	"	"
22	" 27	Diphtheria (?)	"	"
23	" 27	"	Moderate number typical diphtheria bacilli	"
24	" 28	(?)	Typical diphtheria bacilli	"
25	" 28	Follicular tonsilitis	A few fairly typical bacilli	"
26	" 30	Diphtheria (?)	Typical diphtheria bacilli	"
27	" 30	Tonsillitis (?)	"	"
28	Jan. 29	Pseudo-diphtheria	"	"
29	" 30	Membraneous tonsilitis	"	"

ORY OF THE CASE.	AS TO INFECTION OF OTHERS.	HOW CONTRACTED.	REMARKS.
licular tonsilitis; exudate ared in three days.......	None	....	
licular tonsilitis; exudate ared in three days.......	“	....	
an acute pharyngitis; ild	2 cases; 1 mild, 1 very mild.....	From brother..........	No membrane present at any time.
septic; mixed infection;	....	....	Antitoxin not administered.
ollicular tonsilitis; no ane......................	None	....	
sillar membrane, disap- ; after three days.......	Diphtheria prevailing in the institution.....		Inmate of charitable institution; removed to Diphtheria Hospital.
sillar membrane, disap- ; after four days.......	“	“	Inmate of charitable institution; removed to Diphtheria Hospital.
sillar membrane, disap- after three days.......	“	“	Inmate of charitable institution; removed to Diphtheria Hospital.
case of fairly severe true ria......................	None	Not known.	
se of true diphtheria.....	5 cases; the 4th case severe, the other cases mild	....	Attending physician habitually marks slips accompanying cultures “tonsillitis.”
htly ill; no other par- could be obtained.....	None	....	Antitoxin administered twice.
follicular tonsilitis; ld; not confined to bed.	“	Possibly from case in house.	
rst; later clinically true ria with extensive mem-	“	....	Antitoxin administered.
d tonsilitis; no false mem- t any time.........	“	....	Patient well isolated.
seemed to be tonsilitis ly”	....	....	
ned.........................	....	....	
....	Not known........	Not known............	
pical tonsilitis; not con- bed; well in five days	None.............	Possibly from child in family..............	
rse that of a true diph- typical membrane.......	“	....	
ourse that of a true ria; paralysis of lower ties	“	From a case of membranous croup......	
onstitutional symptoms; iphtheria..............	None; no other children in family.	....	Antitoxin not administered; treated at dispensary during whole illness.
st and diagnosis doubt- ecame severe; course true diphtheria	None.............	....	Adult; antitoxin administered.
urse that of a typical acute s.........................	“	....	
rse that of a typical ton-	“	....	Antitoxin not administered.
d; clinically follicular s; no membrane......	“	From aunt in same house..............	
sillar diphtheria; mem- disappeared after two	Diphtheria prevailing in the institution		Inmate of an institution; removed to Diphtheria Hospital; antitoxin administered.
; no membrane..........	“	“	Inmate of an institution; removed to Diphtheria Hospital; antitoxin administered.
a case of true diptheria; e membrane..........	None..............	From another case in same family three days previous	
severity, tonsillar mem- isappearing after three	Diphtheria prevailing in the institution......		Inmate of an institution; removed to Diptheria Hospital; antitoxin administered.

No.	DATE.	PHYSICIANS' DIAGNOSIS ACCOMPANYING CULTURES.	RESULT OF BACTERIOLOGICAL EXAMINATION.	RESULT ANIMAL IN LATION
30	Jan. 30	Follicular tonsilitis	Abundant typical diphtheria bacilli	Virulent
31	" 30	"	Typical diphtheria bacilli	"
32	Feb. 3	"	"	"
33	" 6	"	"	"
34	" 11	(?)	"	"
35	" 11	Non-diphtheric tonsilitis	"	"
36	" 12	Follicular tonsilitis	A few bacilli, typical in shape, but with even staining	"
37	" 18	Tonsilitis (?)	Typical diphtheria bacilli	Non-virulen
38	" 18	"	"	Virulent
39	" 16	Diphtheria (?)	"	"
40	" 27	"	Small, but typical diphtheria bacilli	"
41	" 27	"	Typical diphtheria bacilli	"
42	Mar. 4	Pharyngeal diphtheria	"	"
43	" 6	Rhinitis and laryngitis	"	"
44	" 8	Pseudo diphtheria	"	"
45	" 11	Acute tonsilitis	"	"
46	" 11	"	A few typical diphtheria bacilli	"
47	Apr. 5	Follicular tonsilitis	Typical diphtheria bacilli	"
48	" 6	"	"	"

HISTORY OF THE CASE.	AS TO INFECTION OF OTHERS.	HOW CONTRACTED.	REMARKS.
Mild; typical follicular tonsilitis; no false membrane at any time.	Diptheria prevailing in the institution		Inmate of an institution; removed to Diphtheria Hospital; antitoxin administered.
Mild; typical follicular tonsilitis at first; tonsillar membrane disappearing after three days.....	"	"	Inmate of an institution; removed to Diphtheria Hospital; antitoxin administered.
At first typical follicular tonsilitis, but membrane appeared (tonsillar) and persisted for five days.	"	"	Inmate of an institution; removed to Diphtheria Hospital; antitoxin administered.
Clinically true diphtheria; very severe........................	None...............	Not known............	Antitoxin not administered.
Mild; typical follicular tonsilitis; croupy and hoarse on the third day	"	"	"
Very mild, simple acute pharyngitis; no false membrane................	"	"	Case recovered in three days.
Course of disease that of a true diphtheria..........................	....	....	
Clinically an acute tonsilitis, very mild............................	Diphtheria prevailing in the institution......		Inmate of an institution.
Clinically a case of true diphtheria, mild...........................	"	"	"
Began with convulsions and high fever; at first apparently follicular tonsilitis; later scarlet fever and diphtheria.............	None..............	Not known............	
Clinically a very mild case of acute tonsillitis..........................	Diphtheria prevailing in the institution		Inmate of an institution.
Not obtained	Not known........	Not known............	
No information obtainable	"	"	
"	"	"	Inmate of an institution.
Clinically appeared to be a very mild acute pharyngitis; no membrane	....	From another case in family..............	Except for occurrence of previous case no culture would have been taken.
A moderately severe true diphtheria; extensive membrane ..	....	From another case (membraneous croup) in same family, but in another house....	This and succeeding case in same.
A moderately severe true diphtheria; extensive membrane...	....	From another case (membraneous croup) in same family, but in another house....	This and previous case in same family.
At first follicular tonsilitis, throat had cleared up; then severe croup requiring intubation.......	Not known........	Not known............	
Appeared finally to be a moderately severe case of true diphtheria .	1 case, same family.	"	Antitoxin administered; case recovered.

THE PRODUCTION OF DIPHTHERIA TOXIN,

BY

W. H. PARK, M. D., and A. W. WILLIAMS, M. D.

(From the Bacteriological Laboratory of the Health Department of the City of New York.)

The production of diphtheria antitoxin was undertaken by the New York City Health Department in September, 1894. The number of horses, at first limited to a few, was gradually increased until in January, 1895, forty were under treatment. In order to supply sufficient toxin for the injection of these horses it had to be produced in large quantities. It was also desirable to obtain the toxin in as concentrated a form as possible, so that the horses, which required ever-increasing amounts, should not receive subcutaneously too large quantities of fluid. The statements of Roux and Behring were so explicit as to the methods of producing toxin that their advice was followed for a time without questioning. At considerable expense and trouble, virulent diphtheria bacilli were either grown for several weeks in broth contained in especially constructed flasks, and under a constant current of fresh air, as advised by Roux, or the bouillon cultures contained in Erlenmeyer flasks were allowed to stand in the incubator at 35° for from four to six weeks, as recommended by Behring.

The results were not satisfactory. The toxin produced by these methods had generally a strength such that 0.1 cubic centimetre would kill a 250 gramme guinea pig in four to five days (Behring's normal toxin). Occasionally 0.05 cubic centimetres would kill, while, on the other hand, not infrequently 0.2 cubic centimetres or even more was required.

The moderate strength of the toxin obtained with abundant growth of bacilli, and the fact that the toxin was never found to increase at later periods in cultures after they had developed for three weeks at 35° C., but rather was frequently found to slowly disappear when these were left longer in the incubator, made us resolve to thoroughly investigate in a practical way the length of time needed for the production of toxin, and the best conditions, both as to culture and media, under which to obtain it. The rapid production of very poisonous toxin in human and experimental diphtheria suggested to us that under favorable conditions it would probably be as quickly produced by very virulent bacilli in bouillon.

The experimental work described in this paper was done in the Bacteriological Laboratory of the Health Department of the City of New York, of which Dr. Hermann M. Biggs is the director, and comprises two series of investigations.

Technique.

The bouillon in each set of experiments, after being prepared from meat in the regular way, was first poured into a single vessel and made neutral to litmus. From this common stock portions were removed, and, after having added the amounts of normal soda solution and peptone desired, were poured into 600 cubic centimetre Erlenmeyer flasks. All the flasks contained the same amount of bouillon—250 cubic centimetres—and were similarly stoppered with cotton. In the second series of experiments each flask was covered by a paper cap as an additional precaution to to prevent contamination. All the flasks were placed in the same incubator and kept at a temperature of 35° C. By these means all the conditions for the growth of the different cultures were exactly similar except those which we purposely made different, such as the amounts of peptone and of alkali, and the degrees of virulence of the different bacilli used. The inoculation of the bouillon in all the flasks of each series with the diphtheria bacilli was made from a single bouillon culture of forty-eight hours' growth. Each flask was inoculated with an equal amount—2.5 cubic centimetres—of this thoroughly shaken culture.

In order to test the influence of the reaction, of the percentage of peptone, and of the degree of virulence possessed by the bacillus upon the production of toxin, the following scheme was carried out. The details of the second experiment, as being the most extensive, will be first described, and then later the points in which the first one differed from it. The bouillon used contained only faint traces of glucose derived from the meat. After being mixed thoroughly, it was divided into three portions. To one-half of the bouillon 1 per cent. peptone, to one-third 2 per cent. peptone, and to one-sixth 4 per cent. peptone was added. Each one of the three portions of neutral bouillon was then further subdivided into four equal parts. The first part was left neutral, to the second 5 cubic centimetres, to the third 10 cubic centimetres, and to the fourth 15 cubic centimetres of normal soda solution (40 grammes of sodium hydrate to the litre) were added. With these different varieties of bouillon, seventy-two 600 cubic centimetre Erlenmeyer flasks were partly filled, each flask receiving 250 cubic centimetres. These flasks, after being both plugged with cotton and covered with loosely-fitting paper caps, were sterilized on three successive days, for one hour each, in Arnold Steam Sterilizers.

The flasks were now finally divided into three groups, each of which contained an equal number of all the different varieties of bouillon. For the inoculation, three cultures were employed which differed somewhat in virulence. The one named 8, which was obtained two months previously from a very mild case of diphtheria, killed a 500 gramme guinea pig in a dose of 0.002 cubic centimetres. Culture named R came from a moderately severe diphtheria, while J was from a rapidly fatal case. These two were equally virulent, killing the same sized guinea pigs in doses of about 0.01 cubic centimetre. None of these cultures had been passed through the bodies of guinea pigs, being merely transplanted from the pellicle into fresh bouillon every two days. The flasks of each division were inoculated with 2.5 cubic centimetres of a 48 hours' growth from a single flask of one of the three cultures. The flasks were then all placed in the same incubator and kept at a temperature of 35 degrees C.

After 24 hours' growth in the thermostat, a measured quantity was withdrawn from each flask, after its contents had been shaken, by means of sterilized pipettes, and placed in sterile glass bottles; after the addition of 0.5 per cent. of carbolic acid, these bottles were stored in the ice chest. From a certain number of flasks, larger quantities were withdrawn and immediately filtered. To the filtered culture fluid, after testing its sterility, 0.5 per cent. carbolic acid was also added.

At the time that the fluid was removed from each flask, agar plates were made from each culture in order to test its purity. From eight cultures, the agar plates were made with a tube of fluid agar to which a loop full of the well-shaken culture had been added. The colonies which developed were then counted, after 40 hours' growth, at 35 degrees C.

Similar drawings were made from all of the 72 flasks upon each of the first days, and then at longer intervals up to the seventy-fifth day.

If, from time to time, one or more flasks became contaminated, they were withdrawn. We were, however, very fortunate in this respect in this second experiment. We believe this to be partly due to the protection of the cotton plugs from dust by the paper caps.

The first series of experiments differed from the second only so far as the bouillon was concerned, in that we added greater amounts of alkali to some of the flasks, and did not use as great amounts of peptone in others. The two cultures were H and P, each killing 500 gramme guinea pigs in dose of 0.025 cubic centimetres. In these experiments we commenced to withdraw the culture fluid on the tenth day, and did not immediately filter any of the test samples. As the details are somewhat intricate, they are summarized in the following table:

TABLE I.

Showing the Number of Flasks Employed, the Amount of Alkali Added and the Cultures Used in the Experiments.

FIRST EXPERIMENT, 30 FLASKS.		SECOND EXPERIMENT, 72 FLASKS.	
1 per cent. peptone, two-thirds of flasks inoculated with culture P and one-third with culture H..	Neutral, 3 flasks.	1 per cent. peptone, 36 flasks, divided equally between the three cultures, 8, R and J.....	Neutral, 9 flasks.
	5 c.c., 3 “		5 c.c., 9 “
	10 c.c., 3 “		10 c.c., 9 “
	20 c.c., 3 “		15 c.c., 9 “
	30 c.c., 3 “	2 per cent. peptone, 24 flasks, divided equally between the three cultures.................	Neutral, 6 “
2 per cent. peptone, one flask of each lot inoculated with H, the others with P..................	Neutral, 3 “		5 c.c., 6 “
	5 c.c., 3 “		10 c.c., 6 “
	10 c.c., 3 “		15 c.c., 6 “
	15 c.c., 3 “	4 per cent. peptone, 12 flasks, divided equally between the three cultures.................	Neutral, 3 “
	25 c.c., 3 “		5 c.c., 3 “
			10 c.c., 3 “
			15 c.c., 3 “

Neutral=Neutral to litmus.

5, 10, 15 c.c.=5, 10 and 15 cubic centimetres of normal sodium-hydrate solution added to each litre of neutra bouillon.

The bacillus 8 killed 500 grm. guinea pigs in 0.002 c.c. dose in 7 days.
“ R “ “ 0.01 “ 2 days; 0.005 c.c. not fatal.
“ J “ “ 0.01 “ 2 “ 0.005 “
“ P “ “ 0.025 “ 2 “ 0.01 “
“ H “ “ 0.025 “ 2 “ 0.01 “

The Period at which the Diphtheria Bacilli begin to Produce Toxin in Appreciable Amount, and that at which the Toxin has Accumulated to the Greatest Extent.

The work of Roux and Yersin* upon this subject is not only the earliest, but also the most extensive. With but minor additions it comprises practically all that has been published upon the subject. Their results, as contained in four reports, may be summarized as follows:

If a flask of slightly alkaline boullion is inoculated with a quantity of virulent bacilli and kept at a temperature of about 37 degrees C., the bacilli rapidly proliferate and produce certain changes in the broth. The reaction of the broth becomes acid in a few days, and then again, in a variable length of time, alkaline. These changes require, under the ordinary methods of growth, three and four weeks, but when the bacilli grow in broth to which a very free access of air is permitted, they may take place within two weeks. Roux and Yersin state positively that strong toxin is not produced by the bacilli in less than three weeks in broth cultures grown in the usual manner, and in those to which a free access of oxygen is supplied by the constant air current in not less than two weeks. They also assert that strong toxin is never produced while the reaction is still acid.

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* Roux.—Annales de l'Institut Pasteur, 1888, 1889, 1890, 1894.

So far as we can determine, the essential portion of their statement, that strong toxin is produced only after the lapse of a number of days and after the alkaline reaction has been established, has been accepted by all German and other investigators. Some, indeed, have discovered that toxin is produced at times somewhat earlier than Roux mentions. Thus Spronck and Van Furenhour,* as shown in their report, have recently obtained strong toxin from a very virulent bacillus within thirteen days in a culture grown under the ordinary conditions, and Aronson† states that by a special method—that of inoculating the bouillon from the pellicle of a forty-eight-hour culture of virulent bacilli—he obtained very strong toxin after eight days.

The following table gives the results of our tests of the amount of toxin present in samples of broth withdrawn from different cultures at different periods of growth:

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* Spronck.—Annales de l'Institut Pasteur, October 25, 1895.

† Hans Aronson.—Berichte der Pharmaceutischen Gesellschaft, May 2, 1895.

TABLE II.

Table of Production of Toxin.

Length of Time of the Growth of the Bacilli in the Culture before the Withdrawal of the Sample Tested.	CULTURES. NO. 8. 2 PER CENT.* 5 C.C.†			NO. 8². FILTRATE. 1 PER CENT.* 5 C.C.†			R. 1 PER CENT.* 0 C.C.†			P. 2 PER CENT.* 10 C.C.†			H. 1 PER CENT.* 0 C.C.†		
	Weight of Guinea Pigs in gms.	Amount Inoculated, c. c.	Result of Inoculation.	Weight of Guinea Pigs in gms.	Amount Inoculated, c. c.	Result of Inoculation.	Weight of Guinea Pigs in gms.	Amount Inoculated, c. c.	Result of Inoculation.	Weight of Guinea Pigs in gms.	Amount Inoculated, c. c.	Result of Inoculation.	Weight of Guinea Pigs in gms.	Amount Inoculated, c. c.	Result of Inoculation.
4 hours ‡	...	...	...	300	2	D. in 2½ days	...	...	...	...	...	...	...	...	...
1 day	324	0.1	D. in 3 days	403	0.025	" 4 "	415	1.00	No reaction	...	...	...	...	...	...
2 days	505	0.01	" 24 "	...	...	...	...	...	...	...	...	...	...	...	...
2 "	548	0.1	" 40 hours	470	0.025	D. in 40 hours	480	1.00	No reaction	...	...	...	...	...	...
3 "	492	0.025	" 2 days	545	0.025	" 2 days	396	0.25	D. in 2½ days	...	...	...	...	...	...
4 "	495	0.01	" 2½ days	...	...	...	483	0.25	" 3 "	...	...	...	...	...	...
5 "	430	0.005	" 2½ "	560	0.0125	D. in 2 days	390	0.10	" 2½ "	...	...	...	...	...	...
7 "	530	0.01	" 40 hours	451	0.005	" 3 "	438	0.10	" 4 "	...	...	...	...	...	...
9 "	529	0.005	" 8½ days	...	...	...	335	0.10	" 4 "	...	...	...	...	...	...
10 "	...	...	...	...	...	...	...	...	...	409	0.25	D. in 40 hours	322	0.25	D. in 40 hours.
11 "	440	0.01	D. in 2½ days	421	0.01	No reaction	...	...	...	...	...	...	...	...	...
11 "	...	...	...	312	0.025	Slight infiltration.	...	...	...	...	...	...	...	...	...
17 "	520	0.005	Induration	...	...	...	...	...	...	...	...	...	...	...	...
18 "	...	...	...	...	...	...	...	...	...	395	0.25	D. in 24 hours	395	0.25	D. in 60 hours
25 "	490	0.01	D. in 2½ days	...	...	...	...	...	...	...	...	...	...	...	...
26 "	...	...	...	...	...	...	...	...	...	421	0.25	D. in 40 hours	306	0.25	No reaction.
35 "	380	0.01	D. in 5½ days	367	0.05	No reaction	385	0.10	Considerable infiltration	...	...	...	...	...	...
40 "	...	...	...	...	...	...	...	...	...	477	0.25	Induration	...	...	...
56 "	340	0.01	D. in 2½ days	...	...	...	290	0.10	No reaction §	458	0.25	No reaction	...	...	...

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* Percentage of peptone.

† Amount of normal soda solution added to each litre of neutral bouillon.

‡ This culture was grown in a different bouillon, but inoculation was made with same bacillus by means of a platinum loopful of the pellicle.

§ This culture was slightly contaminated.

The results tabulated here show that the most virulent bacillus used by us (No. 8) produced appreciable toxin within four hours and strong toxin within twenty-four hours, 0.1 cubic centimeters killing a 324 gramme guinea pig in three days. Moreover, this toxin was produced while the bouillon was of an acid reaction (see Table VII.).

By the fifth day the amount of toxin in this sample of bouillon reached its maximum, 0.005 cubic centimeters killing a 430 gramme guinea pig in two and a half days, and then remained practically stationary, having diminished but little as late as the fifty-sixth day. The other two cultures produced fairly strong toxin in four days, and here also it reached its maximum between the fifth and seventh days. These same results have been repeated whenever the bouillon was equally suitable for a vigorous growth of the bacillus and for the quick production of toxin.

During the past three months bouillon made from fourteen different lots of beef has been used. In all but three the development of the toxin has been about as rapid as that in the experiments given in the table. The growth of the bacilli and the production of toxin in one lot were extremely interesting, being similar to the classical description of Roux and Yersin. During the first day the bacilli grew vigorously and a fairly thick pellicle formed. At the end of 24 hours the original alkaline reaction changed to slightly acid, the growth of the bacilli lessened, and the pellicle partially sank to the bottom of the flask and did not immediately reform. These conditions remained up to the twelfth day, when the acidity began to diminish. On the sixteenth day the pellicle had reformed; the bouillon was turbid and alkaline. No toxin was present on the twelfth day; strong toxin on the eighteenth. In the two other samples, part of the cultures remained acid and no toxin was produced. In one the growth was very scanty. But two of the fourteen samples of non-putrid meat, therefore, were unfit for the purpose of producing strong toxin.

In view of the facts brought out in the preceding experiments, the positive statements of Roux, Behring and many others, that stong diphtheria toxin is never produced until after the culture has grown for several weeks, are certainly very suprising.

The explanation seems to us to be that Roux and Yersin must have had in their first experiments bouillon similar to the three lots last mentioned. Getting uniformly no toxin until the third or fourth week in this variety of bouillon, they came to the conclusion that the bacilli under no conditions produced it earlier. All bacteriologists who have been interested in the production of diphtheria toxin since then seem to have accepted to a very large degree their opinions, without themselves thoroughly investigating whether they were in fact correct.

The gradual disappearance of toxin in some of the older cultures is well shown in the table in cultures P and H, where fairly strong toxin, present in the cultures on the sixteenth day had almost disappeared upon the fifty-sixth and twenty-sixth day respectively, while in cultures 8^2 and J, the toxin present on the fourth day had appreciably diminished in some flasks on the eleventh and eighteenth days. We had even a more striking experience with some cultures grown under a constant current of air; strong toxin was present on the seventh day and entirely absent on the fourteenth day.

The Relation Between the Activity of the Growth of the Bacilli and the Amount of Toxin Produced.

In all of the cultures in which strong toxin developed quickly there was a rapid and abundant growth of the bacillus, with the formation of a more or less thick pellicle within the first thirty-six hours. An abundant growth of the bacilli did not, however, necessarily indicate the production of strong toxin. In the broth to which fifteen cubic centimetres of normal NaOH solution was added per litre, and which generally produced very little toxin, we have noticed the same abundant and rapid growth.

In the broth to which twenty cubic centimetres and thirty cubic centimetres of normal NaOH solution was added per litre, and in which practically no toxin was produced, the growth was slow at first, but later nearly equaled that in the broth to which less alkali was added. In all the broths which have remained acid for some time and which have produced toxin of some strength only after the reaction has become alkaline, the growth during the stage of acid reaction has been somewhat scanty, the pellicle, if formed at all, being slight.

The Relation Between the Number of Living Bacilli in a Culture and the Production of Toxin.

This was sought to be determined in the following way: Eight of the flasks containing the cultures (four with one per cent. peptone and four with two per cent., each lot comprising all four degrees of alkalinity), from which samples were being daily drawn, as described earlier in this paper, were selected for examination as to the number of living bacilli in each cubic centimetre of broth at different periods of growth. The different alkalinities and proportions of peptone gave nearly similar results. The method employed was as follows: The culture fluid in a flask in which the living bacilli were to be counted was first thoroughly shaken and then $\frac{1}{150}$ cubic centimetre was removed by means of a platinum loop. This was inoculated into a tube of sterilized fluid agar cooled down to 40 degrees C., and the whole thoroughly shaken and poured into a petri dish. The colonies were counted at the end of forty hours growth in the incubator. The results are shown in the following table:

TABLE III.

Showing Average Number of Colonies of Bacilli in One Field of Microscope at Different Days.

PEPTONE AND ALKALINITY.	24 HOURS.	48 HOURS.	72 HOURS.	4 DAYS.	5 DAYS.	7 DAYS.	9 DAYS.	11 DAYS.
R—2 per cent., neutral	18	30	43	25	42	16	1⅓	4⅓
1 per cent., 5 c. c.	32	47	45	27	18	10	1	8
1 per cent., 10 c. c.	60	42	25	22	31	3	1⅓	1⅓
1 per cent., 15 c. c.	47	57	40	56	60	13	1⅔	9⅔

In this trial, therefore, the number of living bacilli reached its highest total at the end of forty-eight hours. From the third to the fifth day the number of living bacilli, as shown by the plates, remained nearly the same. Thereafter it rapidly diminished, until at the ninth day it was but one-thirtieth of its former number. Then for a time a moderate increase occurred, the number finally falling again two weeks later. The toxin increased rapidly while there were numerous living bacilli present in the culture, and then when they decreased the toxin ceased to accumulate rapidly, and even in some cases gradually diminished. Here, if new toxin was still being produced, that already present must have been even more rapidly destroyed.

In two cultures in which the acid reaction occurred early and persisted, the number of bacilli never rose above one-third of the number in the above test or in other tests where similar broth was used.

The Amount of Toxin Contained Within the Bodies of the Bacilli, as Compared with that held in Solution in the Bouillon at Different Periods in the Growth of the Culture.

In endeavoring to solve this problem the following experiments were made: First, from two of the cultures—one very virulent (8), the other somewhat less so (R)—a portion was removed each day after they had been thoroughly shaken, and immediately filtered. To the filtrate, after its sterility had been proved, was added 0.5 per cent. carbolic acid. The filtrate was found to contain as much toxin as the unfiltered portion of the cultures removed on the same day. (See Table IV.)

Second, from the quantities removed at different periods in the growth of the culture, the bacilli left on the filter, after the passage of the culture fluid and of considerable quantities of sterile water, were scraped off and allowed to soak in a 0.5 per cent. alkaline carbolic solution for one week. The quantity of water was equal to the amount of culture filtered. The watery extract alone and the watery extract, together with the dead bacilli, were then injected into guinea pigs. Whether the filtrate contained or did not contain very strong toxin, neither the water in which the bacilli had remained nor the water plus the dead bacilli was sufficiently toxic to produce any marked reaction in 500 gramme guinea pigs in one cubic centimetre doses. These tests would seem to show that when under certain conditions toxin is not found in the first days in a culture, it is not because it is locked up in the bodies of the bacilli, but that the conditions are such that the bacilli, although growing perhaps vigorously and possessing full virulence, do not produce toxin.

TABLE IV.

Showing Relative Strength of Filtrate and Carbolized Culture.

CULTURE USED.	ONE DAY'S GROWTH.			TWO DAYS' GROWTH.			THREE DAYS' GROWTH.			SEVEN DAYS' GROWTH.		
R—1 per cent. Peptone, Neutral Reaction.	Weight of Guinea Pig in gms.	Amount Injected in c. c.	Result.	Weight of Guinea Pig in gms.	Amount Injected in c. c.	Result.	Weight of Guinea Pig in gms.	Amount Injected in c. c.	Result.	Weight of Guinea Pig in gms.	Amount Injected in c. c.	Result.
Carbolized culture	415	1.00	No reaction	480	1.00	No reaction	483	0.25	Died in 3 days.....	459	0.25	Died in 40 hours.
Filtrate.....................	435	1.00	No reaction	490	1.00	No reaction	413	0.25	Died in 3 days.....	472	0.25	Died in 40 hours.

TABLE V.

Showing Influence of Percentage of Peptone and of Degree of Alkalinity upon the Production of Toxin.

Peptone.	C.C. of Normal Solution of NaOH to Litre of Neutral Broth.	CULTURES.											
		NO. 8—FIRST DAY.			NO. 8—FIFTH DAY.			R—NINTH DAY.			J—SEVENTEENTH DAY.		
		Weight of Guinea Pig in gms.	Amount Inoculated, c. c.	Result of Inoculation.	Weight of Guinea Pig in gms.	Amount Inoculated, c. c.	Result of Inoculation.	Weight of Guinea Pig in gms.	Amount Inoculated, c. c.	Result of Inoculation.	Weight of Guinea Pig in gms.	Amount Inoculated, c. c.	Result of Inoculation.
Per ct.													
1	0	325	0.10	Slight induration......	253	0.10	Died in 26 hours.....	335	0.10	Died in 40 hours.....	595	0.10	Died in 3 days.
1	5	445	0.10	"	453	0.10	" 40 "	425	0.10	" 3 days......	503	0.10	" 4 "
1	10	440	0.10	Died in 4½ days......	435	0.10	" 40 "	412	0.10	Slight infiltration.....	480	0.10	Considerable infiltration.
1	15	....	....	....	....	....	....	....	....	....	307	1.00	Died in 40 hours.
1	15	340	1.00	Slight induration.....	425	1.00	Died in 2½ days.....	470	1.00	Died in 27 days......	536	0.10	No reaction.
2	0	407	0.10	No local reaction	435	0.10	" 40 hours.....	370	0.10	" 2½ "	645	0.10	Died in 2½ days.
2	5	324	0.10	Died in 3 days	430	0.10	" 26 "	351	0.10	" 40 hours ...	533	0.10	" 40 hours.
2	10	468	0.10	No reaction	490	0.10	" 40 "	325	0.10	" 40 " ...	557	0.10	" 40 "
2	15	....	....	....	...	....	....	....	...	....	345	1.00	" 45 "
2	15	432	1.00	Slight induration.....	590	1.00	Died in 3½ days.....	480	1.00	No reaction	450	0.10	No reaction.
4	0	575	0.10	"	410	0.01	" 45 hours.....	465	0.10	Died in 40 hours.....	485	0.10	Died in 45 hours.
4	5	Second day. 500	0.10	Died in 24 hours......	520	0.01	" 40 "	448	0.10	"	555	0.10	" 2½ days.
4	10	First day. 496	0.10	Slight induration	395	0.01	" 40 "	560	0.10	"	498	0.10	" 2½ "
4	15	....	....	....	484	0.01	No local reaction	....	....	....	....	....	
4	15	421	1.00	Much infiltration.....	298	1.00	Died in 17 hours.....	495	0.10	Died in 40 hours.....	550	0.10	" 3 "

Influence of Percentage of Peptone and Degree of Alkalinity upon the Production of Toxin.

We notice in the experiments of Table V. that culture 8, which gave the strongest toxin, produced it most quickly with the ten cubic centimetre alkalinity in one per cent. peptone and with the five cubic centimetre alkalinity in the two per cent. solution. After the third day the toxin was equally strong in the neutral, five and ten cubic centimetre alkalinities for both percentages of peptone. The four per cent. peptone gave nearly the same results, except that the toxin was somewhat stronger.

With all three amounts of peptone fifteen cubic centimetres of normal soda solution to the litre greatly lessened the formation of toxin. In the earlier experiments still larger amounts of alkali—twenty to thirty cubic centimetres to the litre—almost completely prevented the development of toxin, though not materially inhibiting the growth of the bacilli after the first few days.

In culture R the results were similar for one and two per cent. peptone bouillon, but with four per cent. peptone about equal amounts of toxin were produced in all four degrees of alkalinity. With culture J, toxin was produced under the same conditions as in R, except that the first toxin produced in the broth with one per cent. peptone was in that containing fifteen cubic centimetres of alkali to the litre.

These experiments indicate, therefore, that the diphtheria bacilli will produce strong toxin when the quantities of alkali and of peptone vary within considerable limits. With neutral broth toxin is usually produced, but not so surely, and, as a rule, not so quickly nor to such an extent, as in that to which 5 to 7 cubic centimetres of alkali have been added per litre. The added alkali is probably necessary in bouillon containing considerable traces of glucose. With 10 cubic centimetres to the litre the production of toxin is a little less reliable, and with 15 cubic centimetres much less so. With 4 per cent. peptone, we have found the toxin to be more constantly produced in the decidedly alkaline bouillon, with all the degrees of alkalinity employed.

For the production of toxin on a large scale we have usually adopted the custom of dividing the bouillon into several portions. To one of these 2 per cent. peptone is added, and to the others 1 per cent. and 4 per cent. To the whole, after neutralizing to litmus, we add 5 to 10 cubic centimetres of normal soda solution to the litre. The larger amount of alkali is added to the bouillon containing 4 per cent. peptone. From repeated trials we have found the two per cent. and 4 per cent. peptone bouillon to have averaged a stronger toxin than the 1 per cent., but not infrequently in single trials the 1 per cent. peptone has given the strongest toxin. Larger amounts of peptone (6 per cent. to 10 per cent.) have been tried once experimentally. In this single trial the toxin in the cultures on the seventh day was somewhat stronger in the bouillon containing the larger amounts of peptone, as is shown in the following table :

TABLE VI.

Showing Relation of Toxicity to Percentage of Peptone.

AMOUNT OF PEPTONE ADDED.	TOXICITY.		
Per Cent.	Weight of Guinea Pigs in gms.	Amount Inoculated in c. c.	Result of Inoculation.
2	298	0.01	Died in 3 days.
4	355	0.01	Died in 40 hours.
6	562	0.01	Died in 3 days.
8	745	0.01	Died in 3½ days.
10	675	0.01	Died in 40 hours.

The neutralization of the bouillon in these experiments was done by Mr. James A. Miller, assistant chemist to the laboratory. In doing this it developed that the amount of peptone added to broth influences greatly its reaction to phenolphthalein ; also with different peptones, even from the same house, the reactions to this indicator vary considerably. The peptone which we use requires in a two per cent. solution ten cubic centimetres of normal NaOH to the litre to neutralize the phenolphthalein. In a four per cent, solution twenty cubic centimetres to the litre are required. As peptone is decidedly alkaline to litmus, it will be seen that the greater the amount added, the greater the alkalinity of the broth to this indicator, while, on the other hand, to phenolphthalein the acidity is increased at the rate of five cubic centimetres normal solution to the litre for every one per cent. addded. We have found for diphtheria cultures the litmus to be the best indicator if different percentages of peptones are employed. It is perfectly possible, however, after having decided the proper degree of alkalinity for each percentage of each variety of peptone, to use phenolphthalein for future testing.

The Relation between the Reaction of the Broth Culture and the Amount of Toxin.

Litmus paper was the indicator used in determining the reaction. The guinea pigs into which the inoculation were made weighed from four to five hundred grammes. The amount inoculated in each instance, except those indicated, was 0.1 cubic centimetre.

The results from these experiments are given in Table VII. The broth, after becoming alkaline in any culture, continued so as long as tested. These results show that strong toxin is produced under certain conditions while the broth is still acid. This occurred in those cases where the period of acid reaction was brief and where the amount of acid was not very great. In those cases where the period of acid reaction is longer, little if any toxin seems to be produced until just before the change to alkalinity. The amount of acid present in the broth, therefore, must be small to allow the development of toxin.

TABLE VII.

Showing the Relation between the Reaction of the Broth Cultures and the Amount of Toxin.

CULTURES.	1ST DAY.		2D DAY.		3D DAY.		4TH DAY.	
	Reaction.	Toxicity.	Reaction.	Toxicity.	Reaction.	Toxicity.	Reaction.	Toxicity.
8—1 per cent. peptone, 0 c.c. alkali......	Acid.	Slight infiltration.	Acid	Death in 4½ days.	Neutral	Death in 40 hrs.	Alk.	....
8—1 per cent. peptone, 5 c.c. alkali......	Acid.	Slight infiltration.	Acid.	Death in 24 hrs.	Alk.	Death in 23 hrs.	Alk.	....
8—2 per cent. peptone, 0 c.c. alkali......	Acid.	(1 c.c.) slight infiltration.	Acid.	(1 c. c.) Death in 5½ days.	Acid.	(1 c. c.) death in 40 hrs.; no local reaction.	Acid.	Death in 2¼ days.
8—2 per cent. peptone, 5 c.c. alkali......	Acid.	Death in 3 days.	Acid.	Death in 40 hrs.	Alk.	Death in 40 hrs.	Alk.	....
R—1 per cent. peptone, 0 c.c. alkali......	Acid.	(1 c. c.) no local reaction.	Acid.	(1 c. c.) no local reaction.	Neutral	(¼ c.c.) death in 2½ days.	Alk.	(¼ c. c.) death in 3 days.
8^3—2 per cent. peptone, 5 c.c. alkali......	Acid.	....	Acid.	....	Acid.	....	Acid.	....
8^4—1 per cent. peptone, 5 c.c. alkali......	Acid.	....	Acid.	....	Acid.	....	Acid.	....

CULTURES.	5TH DAY.		12TH DAY.		18TH DAY.		35TH DAY.	
	Reaction.	Toxicity.	Reaction.	Toxicity.	Reaction.	Toxicity	Reaction.	Toxicity.
8—1 per cent. peptone, 0 c.c. alkali................	Alk.	Death in 26 hrs.	Alk.	....	Alk.	....	Alk.	....
8—1 per cent. peptone, 5 c.c. alkali................	Alk.	Death in 40 hrs.	Alk.	....	Alk.	....	Alk.	....
8—2 per cent. peptone, 0 c.c. alkali................	Alk.	Death in 40 hrs.	Alk.	....	Alk.	....	Alk.	....
8—2 per cent. peptone, 5 c.c. alkali................	Alk.	Death in 40 hrs.	Alk.	....	Alk.	....	Alk.	....
R—1 per cent. peptone, 0 c.c. alkali................	Alk.	Death in 2½ days.	Alk.	....	Alk.	....	Alk.	....
8^3—2 per cent. peptone, 5 c.c. alkali................	Acid.	....	Acid.	(¼ c. c.) no local reaction.	Alk.	Death in 18 hrs.	Alk.	....
8^4—1 per cent. peptone, 5 c.c. alkali................	Acid.	....	Acid.	(1 c. c.) no local reaction.	Acid.	....	Acid.	(1 c. c.) no local reaction.

The Influence of Glucose upon the Growth of the Diphtheria Bacilli and Upon the Production of Toxin.

Buchner* and Behring† mention that bacteria produce acid in media containing sugar. Theobald Smith‡ made a more thorough investigation of this subject. He examined bouillon made from 44 samples of meat. Of these, 11 contained no glucose, so far as indicated by the fermentation test. The remaining 75 per cent. contained from faint traces up to as much as 0.3 per cent. of glucose. In bouillon in which no sugar, or at most only a trace of sugar, was present no appreciable acid was produced by the growth of bacteria. He found that as much as 0.3 per cent. of glucose favored the growth of many bacteria, while over 5 per cent. was, as a rule, harmful. He noted that when the growth of the bacteria continued abundant the acid reaction changed to the alkaline within a short time; but that where the amount of acid produced was sufficient to inhibit the growth of the bacteria, alkali was no longer produced, and the culture bouillon remained permanently acid. He considers that small amounts of glucose may be a valuable nutrient to the bacteria, or, on the other hand, that the small amount of acid produced may be of advantage in preventing a too intense alkalinity.

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* Buchner. Arch. f. Hygiene, Bd. III., p. 361, 1885.

† Behring. Zeitschr. f. Hygiene, Bd. VII., p. 178, 1889.

‡ Theobold Smith. Centralblat fur Bakteriologie und Parasitenk., Bd. XVIII., No. 1, 1895.

The especial influence of the presence of glucose in the broth upon the growth of the diphtheria bacillus and upon the production of toxin has been lately investigated by Spronck* and Van Furenhout. They found that if to a bouillon which contained no glucose and in which the growth of the diphtheria bacilli caused no acid, there was added 0.15 per cent. of glucose, the character of the growth changed, as shown in the following summary:

1. Bouillon containing no glucose. The bacilli develop rapidly; the broth is turbid and remains alkaline. Type B of Spronck.
2. Bouillon type B, to which 0.15 per cent. glucose is added. Growth at first active. Reaction of bouillon changes to acid, and growth of bacilli decreases. After ten days to two weeks the reaction becomes alkaline and the bouillon turbid, the growth of the bacilli increasing. Type C.
3. Bouillon Type B to which 0.2 per cent. glucose is added. The bouillon soon becomes acid, and this reaction is usually permanent. The growth of the bacilli is scanty. Type A.
4. Bouillon Type B to which glucose is added in the ratio of 1 to 1,000. The bouillon remains alkaline, the alkalinity being at first slightly reduced and, after the fifth day, greater than at first.

Type B gives the greatest amount of toxin, Type C the next and Type A the least. In Type A there may be none whatever produced. Spronck states that meat, as a rule, contains sufficient glucose to give a growth of Type A; that if such meat is kept for a number of days until it becomes slightly putrid, the glucose will be destroyed by fermentation, and that the growth of the bacilli in the bouillon from such meat will be of the Type B.

Original investigations. It is probable that the conditions under which cattle live and the different laws affecting their slaughter, and the sale of their meat for food may have an influence upon the amount of glucose present in the beef of different countries.

In New York it is practically impossible to obtain the absolutely fresh meat spoken of by Spronck, since the law prevents the sale of meat for food until forty-eight hours after the slaughter. Indeed, meat, as ordinarily obtained at the retail butchers, has been kept from five to seven days. Bouillon from such meat has proved, almost without exception, suitable for the growth of the diphtheria bacilli and for the production of a strong toxin. As tested chemically, these lots of meat have contained but small traces of glucose.

The usual type of growth has been one active from the start, the broth having an acid reaction only up to the second and perhaps the third day.

The development of the toxin has been similar to that in the two experiments previously described. In cultures from only two out of fourteen lots of bouillon was the acid stage protracted. In one the bouillon remained acid until the fourteenth day, and then became decidedly alkaline (Spronck's type C). In the other the culture remained permanently acid in the one per cent. peptone bouillon without the production of toxin (Spronck's Type A). In two per cent. peptone bouillon, however, the growth of the latter was of Type C.

In order to carry out the plan suggested by Spronck, we sent directly to the slaughter-house and obtained a large quantity of chopped beef from a recently-killed animal. A portion of this meat was immediately boiled in the usual amount of water, another portion was soaked over night, another for five and a half days, and the remainder left soaking for two days longer until it became slightly putrid. The bouillon made from the fresh meat was less acid than that from the kept meat. That soaked five days required the addition of three cubic centimetres, and that soaked seven and a half days nine cubic centimetres of normal soda solution to each litre to make them of the same reaction as the bouillon from the fresh meat. The bouillon in all four lots, after being neutralized to litmus, had seven cubic centimetres of normal soda solution added to each litre. In both the four per cent. peptone and the two per cent. peptone bouillon made from all four lots the diphtheria bacillus grew equally well. The period of acid reaction was very brief in all, but was most marked in the bouillon from the meat kept five days. To a portion of each of the four lots an extra twelve cubic centimetres of alkali was added. In these there was no stage of acid reaction whatever.

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* Spronck. Annales de l'Institut Pasteur, October 25, 1895.

We have not found, therefore, that the amount of glucose present in the meat obtained by us in the usual way is apt to be of any serious hindrance to the abundant and rapid production of toxin. By this we do not mean to indicate that in meat obtained from other sources it might not be present in sufficient amounts to be deleterious.

To test the effects of different amounts of glucose in broth, we added from 0.05 to 6 per cent. to different lots. To one lot of neutral bouillon in which the growth of the bacilli produced no acid, the addition of 0.1 per cent. of glucose produced no appreciable effect; 0.2 per cent. of glucose, however, entirely changed the character of the growth. The bouillon became acid on the first day and remained so. The growth of the bacilli was stopped and no toxin was produced. In another sample of bouillon, however, which contained 4 per cent. peptone, and was strongly alkaline to litmus (thirteen cubic centimetres to the litre), and gave to phenolphthalein a reaction of 0.25, an amount of glucose up to 0.5 per cent. had no inhibiting effect on the growth of the bacillus nor on the production of toxin, 0.01 cubic centimetres of a five-days' filtrate killing a 400 gramme guinea pig in three days. The acid reaction developed at the end of twenty-four hours. At the end of forty-eight hours the bouillon was again alkaline. One per cent. glucose added to this bouillon was sufficient to cause such a production of acid that the further growth of the bacilli was prevented. Indeed, on the seventh day the culture was sterile.

A curious result appeared when the acidity of the cultures to which different amounts of glucose had been added was tested with phenolphthalein. All the cultures in the same bouillon, to which different amounts of glucose had been added and in which the acid reaction remained permanent, were found not only intensely acid, but also equally acid. This seemed to us to indicate that the bacilli had grown in all the samples of bouillon containing the different amounts of glucose until the acidity had been so excessive that their further growth was prevented. Those cultures in which the glucose was entirely consumed before the growth of the bacilli was stopped became alkaline as the development of the bacilli continued. We found that cultures in which the acid produced was great enough to stop the growth of the bacilli again developed if sufficient alkali was added. In the bouillon containing excessive amounts of glucose, with each new addition of alkali there would be a new growth of bacilli and a new production of acid, until, finally, all the glucose having been used up, the alkaline reaction became permanent and the culture became that of type C. These incomplete experiments indicate that the composition of the bouillon, and especially its degree of alkalinity, influences greatly the effect of whatever amounts of glucose may be present in the meat.

Summary.

Toxin of sufficient strength to kill a 400 gramme guinea pig in three days and a half in a dose of 0.025 cubic centimetre, developed in suitable bouillon, contained in ordinary Erlenmeyer flasks, within a period of twenty-four hours. In such bouillon, the toxin reached its greatest strength in from four to seven days (0.005 cubic centimetre killing a 500 gramme guinea pig in three days). This period of time covered that of the greatest growth of the bacilli, as shown by the appearance of the culture and by the number of colonies developing on agar plates.

The bodies of the diphtheria bacilli did not at any time contain toxin in considerable amounts.

The type of growth of the bacilli and the rapidity and extent of the production of toxin depended more on the reaction of the bouillon than upon any other single factor.

The best results were obtained in bouillon which, after being neutralized to litmus, had about 7 cubic centimetres of normal soda solution added to each litre. An excessive amount of either acid or alkali prevented the development of toxin.

Strong toxin was produced in bouillon containing peptone ranging from 1 to 10 per cent. The strength of toxin averaged greater in the 2 and 4 per cent. solutions than in the 1 per cent.

When the stage of acid reaction was brief, and the degree of acidity probably slight, strong toxin developed while the culture bouillon was still acid; but when the stage of acid reaction was prolonged little if any toxin was produced until just before the fluid became alkaline.

Glucose is deleterious to the growth of the diphtheria bacillus and to the production of toxin when it is present in sufficient amounts to cause by its disintegration too great a degree of acidity in the fluid culture. When the acid resulting from decomposition of glucose is neutralized by the addition of alkali, the diphtheria bacillus again grows abundantly. Glucose is not present, at least as a rule, in sufficient amounts in the meat as obtained from the New York butchers to prevent the rapid production of strong toxin if the bouillon is made sufficiently alkaline.

In our experiments, when other conditions were similar, the strength of the toxin was in proportion to the virulence and vigor of growth of the bacillus employed.

THE BLOOD CORPUSCLES IN DIPHTHERIA; WITH ESPECIAL REFERENCE TO THE EFFECT PRODUCED UPON THEM BY THE ANTITOXIN OF DIPHTHERIA.

BY

JOHN S. BILLINGS, JR., M. D.,
Assistant Bacteriologist, New York Health Department.

The following investigations were instituted primarily in order to determine, if possible, the effect produced upon the blood by the subcutaneous injections of diphtheria antitoxin and its accompanying horse blood serum. Especial attention has been paid to the red corpuscles, as the greater part of the work done by previous observers upon the blood in diphtheria has been limited to the leucocytes. The question as to the etiology of the leucocytosis observed in diphtheria and the source whence it is derived, has not been touched upon. Those interested in that subject, together with the question of hyper and hypoleucocytosis, are referred to the articles by Ewing and Morse hereinafter quoted. An article by Ewing on "Toxic Hypoleucocytosis" (New York Medical Journal, March 2, 1895), also gives an excellent review of the subject, together with some original experiments.

The investigations of the blood in diphtheria have been comparatively few, and, as stated, have been confined largely to studies of the leucocytes.

Bouchut in 1868 was the first to note an increase in the leucocytes in the blood in diphtheria. The first published observations were those of Bouchut and Dubroisay.[1] They reported twenty-four cases of diphtheria and membranous croup, and found a distinct diminution in number of the red corpuscles in all their cases.

In seven, their count was below 4,000,000 per cubic millimetre, and the average of all the counts in all the cases was 4,461,543 per cubic millimetre. As this last figure doubtless included the counts made at the beginning of the illness as well as those made in convalescence, the diminution noted at the height of the disease must have been considerable. Unfortunately for comparison, the authors gave only one average count for each case. The leucocytes were found to be markedly increased in number in almost every case.

Cuffer[2] made counts of the red and white corpuscles in fifteen cases of diphtheria. In all of his cases but one, the number of red corpuscles was above 5,000,000 per cubic millimetre. He therefore concludes that there is little if any diminution in the number of red corpuscles in diphtheria. On examining his table, we find that a second count was made in only one case; in that one the red corpuscles fell over 1,000,000 per cubic millimetre in two days. It is also to be noted that in three of his cases the red corpuscles reached the remarkable figures of 7,451,000, 7,251,000 and 7,852,980 per cubic millimetre respectively. So that it is an open question whether his counts are not all from one to two million per cubic millimetre higher than they should be. This would make the majority of his cases show an anæmia. He found the leucocytes above normal in only six out of the fifteen cases. This is curious, considering the high counts of the red corpuscles above referred to.

Bouchut[3] in 1879 made one hundred and seventy-seven examinations of the blood in diphtheria, following some of the cases throughout their course. He did this to confirm his first results, which had been contradicted by Cuffer. He reports only twenty-seven of the one hundred and seventy-seven observations, thinking this number sufficient to uphold his views.

Four cases were followed throughout. In one there was no reduction in the number of the red corpuscles; this was a very mild case. In the other three cases there was a reduction of from 610,000 to 1,100,000 per cubic millimetre. He also reports seven observations in single cases. In all but one of these the number of the red corpuscles was below normal, *i. e.*, 5,000,000 per cubic millimetre. He found the leucocytes to be increased in number in the majority of the cases, and states positively that the degree of leucocytosis is directly proportional to the degree of septicæmia; no septicæmia, no leucocytosis and vice versa. Yet in this very article he reports a fatal case showing no leucocytosis; this is directly contradictory to the statement above quoted.

Pee[4] found a leucocytosis in diphtheria, but not so marked as in simple follicular tonsilitis.

Rieder[5] noted the presence of a leucocytosis in diphtheria, but doubted the possibility of any knowledge of the same being of prognostic value. In his cases the leucocytosis disappeared promptly when convalescence began.

Reinert[6] reported one case of diphtheria as follows:

	REDS.	WHITES.	LARGE LEUCOCYTES.	SMALL LEUCOCYTES.	HÆMOGLOBIN.
					Per Cent.
Third day	5,050,000	5,763	91	22	92
Sixth day	4,398,000	7,700	111	39	87

A distinct diminution in the number of the red corpuscles and amount of hæmoglobin took place between the third and sixth days. It is curious that no leucocytosis was noted. The relative numerical proportions of the various forms of leucocytes was about normal, the smaller forms being twenty and twenty-four per cent. respectively.

V. Limbeck[7] noted the presence of a leucocytosis in diphtheria, as also did Halla[8].

Felsenthal[9] reported the results of the examination of the blood in eight cases of diphtheria. He could make out no reduction in the number of red corpuscles nor any changes in their morphology or staining reactions. He found a leucocytosis in all cases, reaching in one instance the enormous sum of 148,229 per cubic millimetre. He found the relative numerical proportions of the various forms of leucocytes to be the same as in pneumonia, *i.e.*, an increase in the so-called polynuclear forms. The leucocytosis disappeared coincidently with the inflammatory phenomena. In one case the leucocytes contained basophilic granulations ; these he held to correspond with the "mastzellen" of Ehrlich. This subject will be discussed later.

Gabritschewsky[10] was the first to investigate the effect of the diphtheria antitoxin upon the blood corpuscles. He examined the blood in fourteen cases and found a leucocytosis in all of them. This leucocytosis diminished progressively after the use of anti-toxin in twelve cases. In two of the fatal cases the number of leucocytes increased after the administration of the antitoxin.

His most important conclusions are that the leucocytosis of diphtheria can be distinguished from that of many other infectious diseases (how, he does not state), and that a steady rise in the number of the leucocytes is usually a bad omen.

Morse[11] examined the blood in thirty cases of diphtheria, only one examination being made in each case. The red corpuscles were normal or above in 21 cases ; below in 9 cases. The hæmoglobin was not estimated. A leucocytosis was present in all but 4 cases, two of the latter being convalescent. Differential counts showed the increase in number of the leucocytes to be chiefly in the so-called polynuclear forms—a simple inflammatory leucocytosis. He believes the leucocytosis to be due to the absorption of toxins, and that so many factors enter into the question that no information of prognostic value is to be gained from examinations of the blood.

Ewing[12] reports 53 cases of diphtheria which he followed throughout as far as possible. All of these received injections of antitoxin ; the number of "units" is given, but not the amount of serum injected. In several instances he has simply given the strength of ten cubic centimetres of the serum, omitting the number of cubic centimetres given. This, of course, tells us nothing. Of these 53 cases, all but four showed a leucocytosis at some time in their course (10,000 per cubic millimetre or above). The four cases in which the number of the leucocytes was normal were all mild and speedily recovered. His differential counts agree with those of Morse and Felsenthal (l. c.). In one case the lymphocytes were markedly increased; 32 and 35 per cent. on two occasions. This the author calls a lymphocytosis. In those cases showing no leucocytosis, the larger mononuclear forms were increased, with a corresponding diminution in the percentage of the lymphocytes. His most important conclusions are as follows:

"In favorable cases, after the injection of antitoxin, the leucocytosis never again reaches its original height." In severe cases "an injection of antitoxin may be followed immediately by rapid hyperleucocytosis or extreme hypoleucocytosis and death." "Antitoxin, within thirty minutes after its injection, causes a hypoleucocytosis," the reduction being chiefly in the uninuclear forms. "The staining reaction of the leucocytes is an accurate measure of the severity of a diphtheria infection, and variations in this reaction often precede changes in other symptoms." The multinuclear leucocytes in favorable cases after treatment with antitoxin show increased affinity for gentian violet. Absence ot this change twelve hours after injection makes the prognosis unfavorable. He also dwells upon the occurrence of "pseudoeosinophile" granules in the protoplasm of the leucocytes. This subject, together with that of the poor staining of the nuclei, will be referred to later in this report.

As regards the effect of injections of serum upon the blood, the literature of such investigations as are adapted to our purpose is very scanty. The various text-books of physiology speak of the destruction of the red corpuscles after transfusion and even after injection of serum, but no references or experiments are given. The most recent contribution to the subject is that of Chapin[13]. He investigated the effect of prolonged injections of horse serum upon the number of red corpuscles and percentage of hæmoglobin in rabbits, guinea pigs and other animals. He himself says that his experiments are inconclusive, but that serum injections as ordinarily employed in therapeutics have little effect upon the corpuscles.

In the following series of observations three classes of cases were examined ; those of diphtheria with and without antitoxin, and those of healthy children injected with antitoxin for immunizing purposes. The cases of diphtheria without antitoxin were those reported from the various dispensaries. All these cases were apparently mild when first seen ; otherwise they would have been injected with antitoxin. Several, however, became severe, and in two cases antitoxin was administered because of the severity. The blood counts in these two cases have been omitted. The cases of diphtheria receiving antitoxin were all seen at the Willard Parker Hospital, and thanks are due to Dr. Somerset, the Resident Physician, for his unfailing courtesy and cordial assistance. The cases which received antitoxin for immunizing purposes were seen at the New York Juvenile Asylum. Several cases of diphtheria had developed there, and all the inmates were immunized. The injections were given by Dr. Studdiford, one of the Inspectors of the Health Department. The antitoxin used in all these cases was that prepared at the laboratories of the Board of Health. The varying amounts and strengths are given in the tables. The regulation Thoma-Zeiss instrument was used for counting the corpuscles. In counting the red cells, the blood was diluted two hundred times with Toison's fluid (sodium chloride 1, sodium sulphate, 8, Bower's glycerine 30, water 160, methyl violet .025), and the number of corpuscles counted in one-half the entire number of squares. This was repeated in a second specimen, thus obtaining a fair average. Toison's fluid preserves the shape of the red corpuscles, and for a longer time than simple salt solution or any of the diluents advised by other investigators. The Zeiss mixer was used in counting the leucocytes, the blood being diluted ten to twenty times with one-third per cent. acetic acid, and the number of leucocytes in four entire fields being taken. The acetic acid solution dissolves away all the hæmoglobin from the red corpuscles, thus rendering them invisible, and brings out the nuclei of the leucocytes quite sharply. In several of the cases the six per cent. salt solution tinged with gentian violet, as advised by Ewing, was used. The nuclei of the leucocytes being stained, they are of course more easily recognizable, but the blood has to be diluted from one hundred to two hundred times in order to prevent the red corpuscles from completely hiding the leucocytes. This of course increases greatly the liability to error. The percentage of hæmoglobin was estimated by means of a v. Fleischl hæmometer, two specimens being taken in each case.

The specimens for microscopal examination were made by the double cover glass method, and after drying in the air for one to two hours were hardened in one of three ways; by heating for two hours at 140 degrees C. according to Ehrlich, by keeping them for one to two hours in a mixture of equal parts of absolute alcohol and ether, or for the same length of time in a saturated aqueous solution of bichloride of mercury. Each one of these methods was used in every case, and on the whole the alcohol and ether mixture gave the best results. In some of the cases the specimens were immediately passed through the flame of an alcohol lamp while still moist, and then hardened as above. The majority of the specimens were stained with a modification of the triple stain first used by Ehrlich. The writer has found the following to be the best method for its preparation: First make saturated solutions of the following stains in hot distilled water: (*a*) Orange G., extra; (*b*) acid fuchsin, extra (Rubin); (*c*) crystalized methyl green. Let them settle for two days and then with a clean dry pipette take of (*a*) 55 c. c. and of (*b*) 50 c. c. and mix. Add to these distilled water 100 c. c. and absolute alcohol 50 c. c. After thoroughly shaking the above mixture, add the following solution drop by drop, shaking thoroughly between each drop; saturated solution of methyl green (*c*) 65 c. c., distilled water 50 c. c. and absolute alcohol 12 c. c. Allow the stain to stand two weeks before using and then take from the middle of the bottle with a perfectly dry pipette. It will keep indefinitely, apparently improving with age. To use it, simply put one or two drops on the cover glass and allow to remain for four or five minutes, wash thoroughly in water, dry between filter paper and mount in balsam. The above is simply a rough working formula, and the stain often has to be made up three or four times before it proves satisfactory. It must be made for a definite purpose, and has to be experimented with in order to make it suitable for such purposes. For instance, if the object of study be chiefly the red corpuscles, the proportions of methyl green and acid fuchsin should be relatively small; the red cells then take on a clear orange stain and changes in their staining reaction can be more readily made out. To study the leucocytes, on the other hand, the amounts of the two stains above mentioned should be relatively large in order to bring out the nuclei and granules. In certain cases the specimens were also stained with eosin and methylene blue, methylene blue alone, eosin hæmatoxilin (Ehrlich's acetic acid mixture), Ehrlich's dahlia solution and safranin. Further reference to these will be made later on.

The estimation of the relative numerical proportions of the various forms of leucocytes was made by counting a certain number of leucocytes in specimens stained with the above numerical triple stain. From 250 to 1,000 leucocytes (an average of 500) were counted in each case, the counting of the same leucocyte twice being avoided by the use of the mechanical stage. This is a tedious process, it is true; an objection often raised against it. But so far no other reliable method for accomplishing the same purpose has been advanced. Elzholz[14] has proposed a method which is theoretically perfect. He uses the large Zeiss mixer, diluting the blood ten times only. His solutions dissolve away the majority of the red corpuscles, and the leucocytes are stained with gentian violet and eosin. They are then counted on the Thoma-Zeiss counting stage as modified by Zappert; this has nine times the area of the form ordinarily used. In practice this method is very disappointing, as the solution of the red corpuscles is either carried too far or not far enough. Ewing also makes his differential counts with the hæmocytometer, using 6 per cent. salt solution, tinged with gentian violet, and a dilution of 1-100. The writer has not been able to make satisfactory differential counts in this way. The only forms to be differentiated are large and small leucocytes and eosinophiles. The nuclei of the polynuclear forms are often contracted into a ball, and are very hard to distinguish from the true mononuclear forms, while the diff tiation of a large lymphocyte and a moderate-sized mononuclear is impossible. In the follo tables the leocytes are grouped under four heads: (P) So-called polynuclears, those with polymorphous nuclei and neutrophilic protoplasm, or rather neutrophilic granules in protoplasm. A short description of these granules will be given later. (L) Large and me sized mononuclear forms, and the so-called transition forms, with incurved nuclei. The true of transition is probably the appearance of granules in the protoplasm of these cells. (S) mononuclear forms and lymphocytes. These forms are distinct, but their differentiation i always possible, so they are grouped together. (E) Eosinophiles—cells with polymor nuclei and coarse refractive granules which show an especial affinity for eosin and other stains.

For the sake of brevity, the above letters (P, L, S and E) are used at the heads of the colu showing per cent. of the various forms in the different tables.

TABLE I.

Cases of Diphtheria Treated without Antitoxin.

No.	Name.	Age.	WHEN SEEN AND CHARACTER OF ILLNESS.	DATE AND HOUR OF EXAMINATION.	RED CORPUSCLES.	LEUCOCYTES.	Hæmoglobin. Per ct.	LEUCOCYTES. PER CENT.				STAIN SPECIM
								P.	L.	S.	E.	
1	B. M.	6	First seen July 25. Ill two days. Membrane on both tonsils; temperature 103.2° F. Case of moderate severity..........	July 25	6,112,000	19,800	94	79.6	7.2	12.9	.3	See rem
				" 26	5,792,000	21,600	91	78	11	11	0	
				" 29	4,072,000	18,700	81	....	....	....	...	
				Aug. 2	4,448,000	19,200	78	80	8	11	1	
				" 6	4,960,000	11,600	83	....	....	....	...	
				" 12	5,433,000	12,800	88	72.6	6.4	12.1	.9	
2	J. M.	2½	First seen August 7. Ill one day. Membrane on right tonsil; no fever. Mild case.	" 7	5,640,000	13,800	96	76.3	......	15.6	.8	"
				" 8	5,532,000	15,000	96	....	7.3	.....	...	
				" 10	5,170,000	12,000	90	71	....	18	1	
				" 13	5,260,000	18,000	88	78	10	11	2	
				" 17	5,476,000	10,100	83	....	9	....	...	
3	G.W.	3	First seen August 13. Ill two days. Membrane general; bad diarrhea; temperature, 102° F. Severe case....	" 13	5,632,000	18,700	98	81.2	8.6	9.8	.4	"
				" 15	4,416,000	9,200	68	68	16	15	1	
				" 17	4,371,000	14,400	68	....	....	....	...	
				" 19	4,896,000	21,700	74	79	11	10	1	
				" 22	4,192,000	9,000	63	....	....	....	...	
				" 28	4,762,000	11,100	81	77	4	18	1	
4	L. L.	2	First seen August 24. Ill one day. Membrane general; temperature, 104° F. Severe case; antitoxin given on sixth day....	" 24	5,200,000	22,800	96	80	8	12	0	"
				" 25	4,980,000	20,200	92	78.6	9.3	11.1	.2	
				" 27	4,870,000	18,300	91	....	....	....	...	
				" *29	4,620,000	28,000	87	83	4	13	0	
5	A. S.	5	First seen August 26. Ill one day. Membrane on both tonsils; no fever. Mild case	" 26	5,800,000	12,500	98	72.6	6.1	20.6	.7	"
				" 28	5,670,000	13,300	96	....	....	....	...	
				" 30	5,810,000	11,000	96	74	5	20	1	
				Sept. 6	5,573,000	7,600	98	....	....	....	...	
				Aug. 28	6,496,000	31,000	100	88.2	7.3	4.3	.2	
				" 30	5,800,000	17,000	90	....	....	....	...	
6	D. H.	2½	First seen August 28. Ill one day. Membrane general; temperature, 103.6° F.; severe case.....	Sept. 2	5,324,000	22,000	78	80	8	12	0	"
				" 4	4,810,000	16,300	72	....	....	....	...	
				" 7	5,080,000	15,400	72	75	6	18	1	
				" 12	5,984,000	11,000	76	....	....	....	...	
7	J. G.	18	First seen November 19. Ill five days No membrane, but general infection...	Nov. 19	4,561,000	17,300	70	78	9.1	12.5	.1	"
				" 20	4,896,000	18,500	69	77	11	12	0	
				" 21	4,608,000	14,000	71	75	9	15	1	
				" 26	4,981,000	10,800	73	....	....	....	...	
				" 30	5,260,000	9,600	76	....	....	....	...	

* A. M. and P. M.

Remarks on Table.—In the several cases tabulated above the patients were all seen at homes. The treatment was of the simplest description; in all the cases but one it consisted tonic of tr. ferri chlor. and strychnine, and when the age permitted a simple gargle. As previo stated, all the cases were apparently mild when first seen, but three out of the seven became quite severe. In five cases there was a distinct fall in the number of red corpuscles per cubic millimetre. The two cases showing no fall were both very mild, one (7) showing no membrane at any time. The diminution in the other cases ranged between 470,000 by the third day (2) and 2,040,000 by the sixth day (1). A word may be inserted here as to the limitations of the Thoma-Zeiss instrument. If used by different observers, especially if they are not using it constantly and as a matter of routine, the results may vary widely. Under the most favorable circumstances, when the various stages are all carried through by the same person, and that person thoroughly skilled in the use of the instrument, the limit of error may be markedly reduced, but it has always to be taken into account. In the case of the red corpuscles we should consider two counts within 200,000 of each other as practically the same. It is more difficult to determine the limit of error as regards the leucocytes. In the present series of observations it has been put at 3,000. Another question to be considered is what constitutes the normal number of the corpuscles, white and red. The personal equation enters into the question, and each observer should determine his own normal standard. It is therefore enough to say that any number below 10,000 per cubic millimetre has been taken for the normal number of leucocytes, and above 5,000,000 per cubic millimetre for the red corpuscles. The high count of the red corpuscles in some of the cases here reported is rather surprising, and it is possible that the normal for infants has been set too low. In these seven cases the diminution in number of the red corpuscles would seem to be directly proportionate to the severity of the case, as inspection of the table will show. As a rule, no marked diminution could be made out until after the third or fourth day; possibly corresponding to the production of the toxins and their entrance in quantity into the blood. In the four severe cases the number of the red corpusles had not returned to normal when observation of them ceased. In Case 2, a mild one, the number of the red corpuscles returned to normal in about ten days; in Case 5 there was no fall, and Case 7 exhibited a steady rise from the beginning of observation.

Stained specimens were examined for evidences of degeneration or destruction of the red corpuscles. So far as our present knowledge of the subject goes, the following are the signs of such changes:

1. Diminution in number.
2. Variations from the normal in shape (polkilocytosis).
3. Variations from the normal in size (schizocytosis).
4. The presence of free pigment in the blood (melanæmia).
5. Variations from the normal in staining reaction.
6. Presence of nucleated red corpuscles.

The last mentioned sign (6) is truly an evidence of regeneration, but, so far as is known, occurs only where such regeneration is secondary to preceding degeneration. (Exception is made of leukaemia and of the blood of very young children.)

The blood in severe secondary and pernicious anæmia always shows the presence of red corpuscles, which, when stained with the triple stain, take on a violet instead of an orange tint. This is due to a loss of affinity for the acid components of the stain (acid fuchsin and orange green), and an increased affinity for its basic component (methyl green). In a word they are neutrophilic, *i.e.*, take up a combination of the three stains, and from this fact have received the name "polychromatophilic" red corpuscles. The protoplasm of almost all of the giant nucleated red corpuscles seen in pernicious anæmia show this staining reaction, as do also a smaller number of the ordinary nucleated red corpuscles. For this reason it is disputed whether this phenomenon is degenerative or regenerative in character. For our purpose it is enough to know that it always accompanies degeneration. To bring it out distinctly, the specimens should be heated for only one hour at 120° C., and the stain must contain a relatively small proportion of acid fuchsin.

Changes in shape (2) and in size (3) are rarely observed unless the anæmia be quite marked, 3,000,000 per cubic millimetre or under. The writer has never observed the presence in the blood of what he could convince himself was free pigment. It has been stated to occur in cases of rapid destruction of the red corpuscles, as in pernicious malarial fever for instance.

In the specimens from the seven cases of diphtheria above tabulated, no polkilocytosis (2), schizocytosis (3) melanæmia (4), nor the presence of nucleated red corpuscles (6) were noted. But in Cases 3, 4, 6 and 7, there was apparently an increase in the number of the polychromatophilic red corpuscles. The word "increase" is used because these corpuscles are occasionally seen in normal blood. This phenomenon is merely confirmatory, and must be associated with more definite evidence of degeneration, such as a decided diminution in number of the red corpuscles, in order to be of value.

In all the severe cases a leucocytosis was present, ranging from 34,000 per cubic millimetre to normal. Beyond the fact that the severe cases showed the greatest degree of leucocytosis, no correspondence could be established either with the temperature or with the pulse. Temperature and pulse have been omitted from all the tables as taking up too much space. In all the cases the leucocytosis gradually decreased, except in Case 4, which was not followed throughout, the number of the leucocytes reaching normal in from eight to fourteen days. Differential counts of the leucocytes in stained specimens showed the increase to be mainly in the polynuclear forms, their per cent. ranging between 88 and 68 per cent. The large mononuclear forms seemed to be somewhat increased in number in some of the cases, but as they vary so widely in normal blood (two to twelve per cent.), no definite change can be said to have taken place in them. But the transitional forms between the polynuclear and the large mononuclear forms, which have been grouped with the latter, were seen much more frequently than in normal blood. The small mononuclear forms varied widely, but, as a rule, were decreased in number, in one case falling as low as 4 per cent. An increase of the lymphocytes to 30 to 35 per cent., as noted by Morse and Ewing, may be termed a lymphocytosis, but is not an evidence of any pathological condition, as the writer has observed 32, 33 and 35 per cent. of lymphocytes in perfectly healthy individuals. In health an increase to 30 per cent. is certainly much more common than a fall to 10 per cent. The increase in the polynuclear forms was, as a rule, directly proportionate to the increase in the total number of the leucocytes. The stained specimens were also examined with reference to the staining properties of the nuclei, variations in the size of the polynuclears, and variations from the normal in the granulations of the several forms. Nothing abnormal could be made out. This question is discussed more fully in the remarks on the cases treated with antitoxin.

The hæmoglobin of the red corpuscles shows about the same changes as in all the acute infectious diseases. It falls coincidently with the number of red corpuscles, begins to rise at the same time that they do, but rises much more slowly, not reaching normal until some time after the corpuscles. Thus, in only two of our cases did the hæmoglobin return to its original figures; one case (5) being very mild, and the other (7) being anæmic when first seen, and exhibiting a steady rise in corpuscles and hæmoglobin from the begining of observation. The hæmoglobin, however, had only reached 76 per cent. at the time of the last observation.

TABLE II.

Cases of Diphtheria Treated with Antitoxin.

No.	Name.	Age.	DATE OF ADMISSION AND CHARACTER OF ILLNESS.	DATE AND HOUR.	ANTITOXIN.		Red Corpuscles.	Leucocytes.	Hæmoglobin. Per Cent.	LEUCOCYTES. PER CENT.				STAINED SPECIMENS.
					c.c.	Units.				P.	L.	S.	E.	
1	P. P.	8	Admited June 13. Ill two days. Membrane on right tonsil. Temperature normal. Mild case. Discharged June 20	June 13, p. m.	6	600	....	......	..	....	....	....	..	Negative.
				" 14	....	.....	5,210,000	11,000	92	82.3	4.3	13	.4	
				" 15	....	.....	5,250,000	13,000	91	79.1	5.2	14.6	1.1	
				" 16	....	.....	5,180,000	8,000	90	....	....	....	..	
				" 19	....	.....	5,420,000	6,000	93	72.8	4.7	21.2	1.3	
2	M. B.	2½	Admitted June 14. Ill two days. Membrane on right tonsil. Temperature normal. Mild case	" 14, p m.	5	500	....	......	..	....	....	....	..	"
				" 15	....	.....	4,880,000	10,400	82	78.8	7.5	11	2.7	
				" 16	....	.....	4,721,000	13,000	83	....	....	....	..	
				" 18	....	.....	5,032,000	14,000	90	76.7	6.4	10.3	6.6	
				" 21	....	.....	5,143,000	7,400	91	75.7	5.3	16.4	2.3	
3	B. B.	5	Admitted June 14. Ill two days. General membrane. Temperature, 101.2° F. on admission. Severe case. Discharged July 1	" 14, 3 p. m.	13	1,950	....	......	..	....	....	....	..	"
				" 14, 8 p. m.	10	1,000	....	......	..	....	....	....	..	
				" 15	....	.....	4,980,000	23,000	84	86.7	5.8	7.3	.2	
				" 17	....	.....	5,130,000	16,000	89	80.2	7.1	11.7	1	
				" 19	....	.....	5,200,000	11,000	92	....	....	....	..	
				" 22	....	.....	5,350,000	12,000	91	70.8	8.8	19.8	.6	
4	E. S.	1½	Admitted June 18. Ill two days. General membrane. Temperature first three days, 100° to 105° F. Very severe case. Supperative otitis media. Broncho-pneumonia, July 2. Died July 7	" 19, 11 a. m.	....	.....	5,760,000	30,000	93	87.1	6.3	6.1	.5	Marked differences in size of polynuclears.
				" 19, 11.10 a. m.	13½	2,025	....	......	..	....	....	....	..	
				" 20, 10 a. m	....	.....	5,824,000	26,000	94	88.2	9.4	2.2	.2	Negative
				" 20, 11.35 a. m.	13½	2,025	....	......	..	....	....	....	..	
				" 21	....	.....	5,633,000	18,000	93	79.6	8.3	11	1.1	
				" 24	....	.....	5,783,000	9,800	87	70.3	6.1	21.8	1.8	
				" 27	....	.....	5,810,000	14,000	88	....	....	...	..	
				July 1	....	.....	5,32[illegible],000	8,900	85	....	....	....	..	
				" 3	....	.....	5,018,000	18,000	85	83	5	11	1	
				" 6	....	.....	4,720,000	26,000	77	91	2	7	0	
5	H. W.	1⅓	Admitted June 20. Ill four days. Moribund. Membrane general. Died June 21, p. m.	June 20, a. m.	13½	2,025	....	......	..	....	....	....	..	"
				" 20, p. m.	....	.....	5,001,000	26,300	91	92.6	1.2	5.1	1.1	
				" 21, 10.15 a. m.	...	.....	4,980,000	32,000	89	95.8	.8	3.2	.2	
				" 21, 1.10 p. m.	13½	2,025	....	......	..	....	....	....	..	
6	W. H.	5	Admitted June 22. Ill one day. Membrane on both tonsils. Temperature normal. Medium severity	" 23	5	750	....	......	..	....	....	....	..	"
				" 24	....	.....	5,568,000	15,000	95	64.2	12.9	64.2	.5	
				" 26	....	.....	5,327,000	8,900	90	69.7	8.9	20.8	1.6	
				July 1	....	.....	5,410,000	6,300	88	68.6	8.6	21.9	2.1	
				" 10	....	.....	5,476,000	10,500	92	....	....	....	..	

No.	Name.	Age.	Date of Admission and Character of Illness.	Date and Hour.	Antitoxin. c.c.	Antitoxin. Units.	Red Corpuscles.	Leucocytes.	Hæmoglobin. Per Cent.	Leucocytes. Per Cent. P.	L.	S.	E.	Stained Specimens.
7	M. F.	7	Admitted June 25. Ill four days. Membrane general. Temperature 100° to 102° F. first two days. Severe case. Died June 26, p. m......	June 25, 10.30 a. m.	....	.....	5,856,000	32,000	97	88	.8	10.4	.7	Negative.
				" 25, 10.45 a. m.	6	600	....	......	..	....	....	....	..	
				" 26, 10.30 a. m.	....	.....	5,750,000	38,000	96	92	3	5	0	
				" 26, 10.45 a. m.	6	600	....	......	..	....	....	....	..	
				" 26 p. m.	13	1,950	....	......	..	....	....	....	..	
8	J. O.	10	Admitted June 25. Ill three days. Membrane general. Temperature 103° to 100° F. first three days. Severe case......................	" 25	10	1,000	....	......	..	....	....	....	..	"
				" 26, a. m.......	....	.....	4,600,000	19,000	84	81.8	7.1	10.8	.3	
				" 26, p. m.......	10	1,000	....	......	..	...	....	....	..	
				" 27	....	.....	4,750,000	15,000	83	78.6	4.8	15.4	1.2	
				" 29	....	.....	5,001,000	17,000	88	80.8	6	12.4	.8	
				July 2	....	.....	5,020,000	11,000	92	....	....	....	..	
				" 8	....	.....	5,340,000	6,000	93	71	8	19	2	
9	I. K.	5	Admitted June 29. Ill two days. Membrane on both tonsils. Temperature, 102.5° to 100° F. first three days. Moderate severity..........	June 29	10	1,000	....	......	..	....	....	....	..	"
				" 30	6¼	9.375	....	......	..	....	....	....	..	
				July 1	....	.....	5,008,000	13,000	96	78.1	3.3	17.6	1	
				" 3	....	.....	4,830,000	15,000	95	79	6	13	2	
				" 6	....	.....	5,107,000	9,000	95	....	....	....	..	
				" 10	....	.....	5,000,000	7,000	96	....	....	....	..	
10	F. L.	9	Admitted June 30. Ill two days. Membrane on both tonsils. Temperature, normal. Mild case...	" 1	4	600	....	......	..	....	....	....	..	"
				" 1	....	.....	5,108,000	17,000	84	79.2	7.9	12.3	.6	
				" 2	....	.....	5,080,000	15,000	83	76.8	8.4	14.7	.1	
				" 4	....	.....	5,230,000	9,000	84	....	....	....	..	
				" 6	....	.....	5,160,000	3,000	84	64	11	23	2	
				" 11	....	.....	5,080,000	7,000	84	....	....	....	..	
11	L. S.	3	Admitted July 1. Ill three days. Membrane on both tonsils. Temperature, normal. Moderate severity...............................	" 1, p. m	7	1,050	... .	......	..	....	....	....	..	"
				" 2, 9.30 a. m..	....	.....	4,288,000	14,300	85	74.2	11.1	14.3	.4	
				" 2, 2.20 p. m..	7	1,050	....	......	..	....	....	....	..	
				" 3 ..	....	.....	4,107,000	16,000	84	75	13	12	0	
				" 5 ..	....	.....	4,096,000	18,500	90	74	10	16	0	
				" 11 ..	....	.....	4,500,000	6,800	85	....	....	....	..	
12	S. W.	1½	Admitted July 5. Ill four days. Membrane on both tonsils. Moderate severity. Temperature, normal.................................	" 5, p. m.......	9	1,350	....	......	..	....	....	....	..	"
				" 6, a. m.......	...	.....	5,088,000	12,800	80	71.3	6.2	21.3	.2	
				" 6, p. m.......	13½	2,025	....	......	..	....	....	....	..	
				" 8	....	.....	4,976,000	16,300	79	78.6	10.8	10.3	.3	
				" 11	....	.....	5,136,000	10,600	82	....	....	....	..	
				" 15	....	.....	5,370,000	4,300	88	.. .	....	....	..	
13	R. G	3¼	Admitted July 7. Ill four days. Membrane on both tonsils. Temperature, 102° F. on admission. Case of moderate severity. Anæmic...	" 7, p. m.......	13½	2,025	....	......	..	....	....	....	..	"
				" 8, 4 a. m.....	7	1,050	....	......	..	....	....	....	..	
				" 8, 11 a. m....	...	.....	4,192,000	22,400	80	84	8	8	0	
				" 9	....	.....	4,176,000	28,300	80	86	3.6	10	.1	
				" 12	....	.....	4,560,000	13,000	84	....	....	....	..	
				" 18	....	.....	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	

14	G. G.	1¼	Admitted July 7. Ill four days. Membrane on both tonsils. Moderate severity. Temperature, normal on admission	"	7, 2.30 p.m.	13½	2,025	....	......	..	....	....	....	..
				"	8, 11.30 a.m.	....	.....	6,750,000	26,800	100	85	2	13	0
				"	8, 11.35 a.m.	13½	2,025	....	......	..	....	....	....	..
				"	9	....	.....	6,475,000	25,700	97	80.8	8.1	11	1.1
				"	11	....	.....	6,300,000	19,300	98	....	....	....	..
				"	15	13½	2,025	....	......	..	....	....	....	..
				"	18	....	.....	6,240,000	16,800	99	72	8	17	3
				"	22	....	.....	6,310,000	11,200	100	....	....	....	..
15	E. B.	5	Admitted July 9. Ill six days. Membrane general. Temperature 101° F. Moderate severity	"	8, 8.15 a.m.	13½	2,025	....	......	..	....	....	....	..
				"	8, 11 a.m.	....	.....	4,871,000	21,800	81	79.6	7.4	12.7	.3
				"	9, 11.30 a.m.	....	.....	4,901,000	23,900	81	81	8	10	1
				"	9, 11.45 a.m.	13½	2,025	....	......	..	....	....	....	..
				"	10	....	.....	5,100,000	18,600	86	77	7	15	1
				"	12	....	.....	5,080,000	18,800	89	....	....	....	..
				"	16	....	.....	5,350,000	12,100	93	....	....	....	..
16	J. F.	11	Admitted July 8. Ill four days. Membrane on both tonsils. Temperature, normal. Mild case	"	8, a.m.	....	.....	5,276,000	16,000	93	76.8	2.1	19.8	1.3
				"	8, 2 p.m.	6¼	1,000	....	......	..	....	....	....	..
				"	8, 4 p.m.	....	.....	5,284,000	16,800	91	78.9	5.8	15.4	.9
				"	9, 11 a.m.	....	.....	5,310,000	18,000	95	...	....	....	..
				"	9, 12.20 p.m.	6¼	1,000	....	......	..	....	....	....	..
				"	10	....	.....	5,263,000	12,000	94	70.6	10.1	17.7	1.6
				"	13	....	.....	5,182,000	10,300	98	....	....	....	..
				"	17	....	.....	5,430,000	6,400	96	....	....	....	..
17	E. C.	4	Admitted July 9. Ill three days. Membrane on right tonsil. Mild case. Temperature, normal	"	9	4	600	....	......	..	....	....	....	..
				"	10, 11 a.m.	....	.....	4,768,000	16,500	92	78.1	13.6	8.1	.2
				"	10, 12 m.	4	600	....	......	..	....	....	....	..
				"	11	....	.....	4,650,000	15,800	90	76	9	14	1
				"	13	....	.....	4,830,000	9,200	88	....	....	....	..
				"	17	....	.....	4,988,000	4,500	89	72	5	21	2
18	S.	6	Admitted July 9. Ill two days. Membrane on both tonsils. Temperature, 102.4° F. Severe case	"	9	6⅔	1,000	....	......	..	....	....	....	..
				"	10, 11 a.m.	....	.....	5,600,000	30,800	87	88.2	3.8	7	1
				"	10, 11.55 a.m.	6⅔	1,000	....	......	..	....	....	....	..
				"	11	....	.....	5,448,000	32,000	87	87	4	9	0
				"	15	....	.....	5,580,000	18,000	88	76	7	15	2
				"	20	....	.....	5,420,000	11,000	86	....	....	....	..
19	S. Z.	3	Admitted June 16. Ill one day. Membrane on right tonsil. Mild case. Child apparently anæmic	June	17	6	720	....	......	..	....	....	....	..
				"	25	....	.....	5,733,000	19,500	87	74.4	8.1	13.3	3.2
20	M. M.	3½	Admitted June 2. Ill eight days. Membrane general. Severe case. Child apparently anæmic	"	2	6½	1,000	....	......	..	....	....	....	..
				"	3	5	500	....	......	..	....	....	....	..
				July	10	....	.....	5,980,000	12,300	88	71	4	22	3
21	M. M.	3	Admitted June 26. Ill ten days. Membrane general. Severe case. Child apparently anæmic	June	26	13	1,950	....	......	..	....	...	....	..
				"	27	13	1,950	....	......	..	....	....	....	..
				July	10	....	.....	5,210,000	8,200	94	68.3	11.1	21.1	1.0
22	E. C.	6	Admitted July 8. Ill three days. Membrane on left tonsil. Mild case. Child apparently anæmic	"	8	6⅔	1,000	....	......	..	....	....	....	..
				"	22	....	.....	4,896,000	11,500	82	72	8	18	2
23	L. S.	3½	Admitted July 1. Ill five days. Severe case. Membrane on eyes and throat. Child anæmic.	"	1	7	1,030	....	......	..	....	....	....	..
				"	22	....	.....	4,260,000	14,800	78	70	10	19	1
24	H. G.	7½	Admitted July 20. Ill four days. Membrane general. Severe case. Child apparently anæmic	"	20	4	600	....	......	..	....	....	....	..
				"	21	4	600	....	......	..	....	....	....	..
				Aug.	5	....	.....	5,860,000	6,300	94	75	2	22	1

No.	Name.	Age.	Date of Admission and Character of Illness.	Date and Hour.	Antitoxin.		Red Corpuscles.	Leucocytes.	Hæmoglobin. Per Cent.	Leucocytes. Per Cent.				Stained Specimens.
					c.c.	Units.				P.	L.	S.	E.	
25	J. D.	5	Admitted November 18. Ill one day. Membrane general. Temperature, 101° F. Moderately severe case	Nov. 18, a. m	....	.....	5,536,000	13,300	99	73	10	16	1	Negative.
				" 18, p. m	16	3,000	....	......	..	....	....	....	..	
				" 19, a. m	....	.....	5,381,000	28,800	98	86	7	3	0	
				" 19, p. m	16	3,000	....	......	..	....	....	....	..	
				" 20	....	.....	5,408,000	38,600	96	88.3	4.6	7	.1	
				" 22	....	.....	5,168,000	16,500	90	....	....	....	..	
				" 24	....	.....	5,331,000	22,500	86	81	9	10	..	
				" 26	....	.....	5,741,000	18,800	89	....	....	....	..	
				" 30	....	.....	5,618,000	13,600	91	....	....	....	..	
26	H. S.	2½	Admitted November 15. Ill one day. Membrane on right tonsil. No fever	" 15	12	2,000	....	......	..	....	....	....	..	"
				" 16	....	.....	5,056,000	7,800	91	72.5	6.8	20.1	.6	
				" 18	....	.....	5,008,000	6,500	90	73	5	21	1	
				" 23	....	.....	4,896,000	9,300	86	....	....	....	..	
				" 27	....	.....	5,181,000	3,000	86	....	....	....	..	
27	A. F.	12	Admitted November 21. Ill three days. Membrane on both tonsils. No fever. Mild case	" 21	6	1,000	....	......	..	....	....	....	..	"
				" 22	....	.....	5,480,000	24,900	102	83.6	8.8	7.4	.2	
				" 23	....	.....	5,500,000	20,600	100	85	6	9	0	
				" 25	....	.....	5,731,000	14,400	96	....	....	....	..	
				" 27	....	.....	5,522,000	9,800	93	....	....	....	..	
28	R. D.	3	Admitted November 22. Ill two days. Membrane on both tonsils. Temperature, 103.6° F. Very severe case	" 22	12	2,000	....	......	..	....	....	....	..	All the large mononuclears in the transition stage.
				" 23, a. m	....	.....	5,162,000	3,100	98	58.1	30.9	11	0	
				" 23, p. m	12	2,000	....	......	..	....	....	....	..	
				" 23, p. m (one hour after antitoxin.)	....	.....	5,183,000	6,700	97	55	28	17	0	
29	A. S.	12	Admitted November 23. Ill three days. Membrane general. Temperature, 102.2° F. Severe case	Nov. 23	13	3,000	....	......	..	....	....	...	..	Negative.
				" 24, a. m	....	.....	5,386,000	15,600	88	71.2	10.8	17.8	.2	
				" 24, p. m	13	3,000	....	......	..	....	....	....	..	
				" 25	....	.....	5,162,000	19,300	86	76	149	10	0	
				" 27	....	.....	5,002,000	11,200	85	74	....	16	1	
				" 30	....	.....	5,281,000	9,600	88	....	....	....	..	

Remarks on Table II.—Of the cases cited twenty-three were followed throughout and six were examined only once. They will be called the "complete" and "incomplete" cases, espectively. Let us take up first the complete cases (1 to 18 and 25 to 29). In six of the twenty-hree cases a diminution in number of the red corpuscles was noted. In Cases 6, 25 and 29 there were falls of 241,000, 368,000 and 384,000 per cubic millimetre, respectively. In Case 4 there was no fall until the eleventh day of the disease, when broncho-pneumonia set in, the patient dying on the seventeenth day. A fall of 1,000,000 was noted in this case. In Cases 9 and 11 falls of 178,000 and 192,000, respectively, were noted. These cases can be ruled out as falling within the limit of error, before mentioned, and if we are justified in assuming the fall in Case 4 to be due to he sepsis and pneumonia, we have three cases out of twenty-three showing a diminution in the number of red corpuscles, and that diminution less than 400,000 in each case. These cases, while not absolutely unfavorable, were all severe. Some of them were admitted at a comparatively ate stage in the disease, and were already anæmic. These latter cases showed a steady rise in the number of corpuscles (Cases 3, 8, 11, 12, 13 and 15). In only five of the cases was it possible to examine the blood before the administration of the antitoxin, as they were usually admitted ate in the afternoon, and received an injection of antitoxin at once. Two of these cases resulted n death, two were of moderate severity, and one was a mild case. Not one of them showed any appreciable reduction twenty-four hours after the administration of antitoxin. In one case the blood was counted two hours after the injection (16).

The amount of antitoxin injected varied from three to forty-one and a half cubic centimetres Case 14, in three doses). The largest single dose given was sixteen cubic centimetres (Case 25). The strength in antitoxin units varied from five hundred to six thousand and seventy-five units (Case 14). The greatest amount given at one dose was three thousand units (Cases 25 and 29). Of the three cases showing a diminution in the number of the red corpuscles, two received large doses of antitoxin, both as to amount and strength. Case 25 received thirty-two cubic centimetres, with a total strength of six thousund units, and Case 29 received twenty-six cubic centimetres, with a total strength of six thousand units. The third case received only five cubic centimetres, with a strength of seven hundred and fifty units. So that it is possible that large doses of antitoxin may, by virtue of their strength or amount, bring about or permit of a reduction in the number of red corpuscles. But it must be remembered that these were severe cases, which in the judgment of the attending physician required large doses of antitoxin, and which would probably have shown a marked fall in the number of the red corpuscles f the antitoxin had been omitted. Case 14, which received forty-one and a half cubic centimetres, with a total strength of six thousand and seventy-five units, showed no reduction at all.

The microscopical examination of stained specimens revealed nothing abnormal. An occasional polychromatophilic red corpuscle was seen, but in the observer's opinion they were present much less frequently than in the cases of diphtheria treated without antitoxin. But, as before stated, this evidence of degeneration is untrustworthy except as confirmatory.

In twenty-seven out of the twenty-nine cases a leucocytosis was observed, ranging from 38,600 in Case 25 to normal. The severe cases showed the greatest increase. But the severest case of all (23), in which the patient was practically moribund on admission, showed no leucocytosis at all. The other case (26) showing no leucocytosis was very mild in character. But beyond a rough correspondence to the degree of severity of the case the amount of leucocytosis did not correspond to any particular clinical feature, nor could the observer form any idea from it as to the final outcome of the case. The leucocytosis is independent of the pulse, the temperature or the amount of membrane. But while a high grade of leucocytosis is, as a rule, seen only in the severe cases, the ordinary clinical examination of the patient is of much greater value in forming a prognosis and in indicating the line of treatment, than any information to be gained from the examination of the blood. The latter is simply confirmatory, never indispensable. As to the influence of the antitoxin upon the course of the leucocytosis, the cases here reported furnish no evidence that it has any effect whatever. True, the leucocytosis diminishes in the majority of the cases, but it does the same in the cases of diphtheria treated without antitoxin, as comparison of the tables will show. The leucocyte curve does not seem to have reached normal any sooner in the cases with antitoxin than in those without. In several of the cases ending favorably, the number of the leucocytes was greater twenty-four hours or more after the antitoxin was given than before (Case 14, for instance). We have no explanation for the sudden and marked variations that take place in the course of leucocytoses in acute diseases, such as pneumonia and scarlet fever. These often amount to from 10,000 to 15,000 per cubic millimetre; such variations are seen in Cases 3 and 6 of Table I. They can also be noted in the series of cases reported by Bouchut (l. c.), so that we would expect to see them in the antitoxin cases, and are hardly justified in ascribing them to its use. It is not denied that the injections of antitoxin may have some effect upon the number of the leucocytes. But such effect is immediate and transitory, appearing within the first hour and disappearing again by the end of twenty-four hours. In common with many other substances, the injections of antitoxin are stated to bring about an immediate reduction in the number of the leucocytes, the so-called hypoleucocytosis. But unless the injected substance be toxic and capable of producing a reactionary hyperleucocytosis, the number of the leucocytes promptly returns to the normal, and no trace of any change is observable at the end of twenty-four hours. In the above cases no attempt was made to determine the immediate effect of the injections of antitoxin upon the leucocytes, some idea of its ultimate effect being all that was aimed at.

Stained specimens showed the same state of things as already noted in the remarks on Table I. The polynuclear forms of the leucocytes were increased and the small mononuclear forms diminished, as also were the eosinophiles. Case 28, the fatal case with no leucocytosis, showed a marked increase in the mononuclear and transitional forms, the polynuclear and small mononuclear forms being correspondingly diminished. No changes in the staining reaction of the nuclei were observed, except in one case, which is not given in the above table. The child was practically dead when the blood was examined, the heart ceasing to beat five minutes afterward. Here all the nuclei of the leucocytes refused to stain, the leucocytes being heaped together and partially disorganized. Ewing states that by the use of 6 per cent. salt solution faintly tinged with an alcoholic solution of gentian violet, he is able to differentiate two classes of polynuclears in the blood in diphtheria, those with poorly stained nuclei and those with well stained nuclei. This loss of affinity for gentian violet shown by the first class he holds to be due to the necrotic action of the toxins present in the circulating blood, and states that this loss of affinity is present in all cases of diphtheria that are at all severe. He also states that the use of antitoxin in favorable cases is followed by a recovery of this affinity, and hence that observation of this fact is of prognostic importance. The writer followed Ewing's procedures faithfully in the last seven cases in the above table, varying the amount of gentian violet and using different magnifying powers, but was unable to obtain similar results in any case. It is difficult, well-nigh impossible, to outline the nucleus, using the above solution and the hæmocytometer. The leucocytes are not flattened out, but globular, and take up the stain with such intensity that differentiation of the nucleus from the protoplasm is almost impossible, as above stated. Another point to be considered is that in normal blood the nuclei of the polynuclears exhibit the most varied intensity in their staining reactions, from the colorless nuclei of the so-called "leukocytenschatten" to the almost black staining nuclei of the small polynuclear forms. No variations from the normal in the staining reaction of the nuclei were made out in the dried and stained specimens.

A few words concerning the granulations of the leucocytes may be added here. There are four varieties of granulation stated by Ehrlich[15] to occur in the protoplasm of the leucocytes in human blood.

1. The oxy- or eosinophilic; these take up only the acid stains, such as eosin, acid fuchsin, etc.
2. The basophilic; these take up only the basic stains, such as methylene blue.
3. The neutrophilic; these take up in preference a combination of the acid and basic stains. Hence the name.
4. The amphophilic; these take up either acid or basic stains, but not their combinations.

To the first class belong the eosinphiles, to the second some of the large mononuclear forms, to the third the polynuclear forms, to the fourth the so-called "mastzellen" of Ehrlich. These latter are excessively rare in human blood. The great majority of the mononuclear forms have no granulations; at least none have as yet been demonstrated. Ewing states that in diphtheria the granulations in a certain number of the polynuclear leucocytes lose their affinity for neutral stains, such as eosin. These forms he calls pseudo-eosinophiles, and asserts that the change is due to the necrotic action of the circulating toxins; he thinks they are identical with the forms showing poorly stained nuclei, and so estimates their percentage by the salt solution and gentian-violet method.

Now the statement that the neutrophilic granulations of the leucocytes in normal human blood are absolutely neutrophilic is not correct. They have an affinity for eosin, although it is a weak one, and the eosin is quickly washed away by water; it can be demonstrated by staining with one-half per cent. solution of eosin in seventy per cent. alcohol, washing very rapidly in water, and drying immediately between filter paper. On examination the granules of the polynuclears will be found to be stained red. Again, if a specimen of normal blood after being hardened be stained in the above solution and then be passed directly into a strong aqueous solution of methylene blue, we have all the conditions present which are necessary for a neutral stain. That such staining does take place any one can demonstrate for himself. If, on the other hand, after staining with the eosin we wash the specimen thoroughly and carefully in water before staining with methylene blue, the granules will be completely decolorized and invisible. Now, the above procedures were tried upon specimens of blood from five healthy individuals and upon specimens of blood from six or seven of the severest cases of diphtheria in the Willard Parker Hospital. Both sets of specimens showed the granules in a certain number of the leucocytes to be stained when the washing with water was omitted, and all the granulations were unstained when the specimens were thoroughly washed in water before using the methylene blue. So that the writer was unable to differentiate these pseudo-eosinophilous granules, and is inclined to believe them due to the staining methods used, rather than that they really exist as pathological entities.

Pane[16] described certain granules staining with methylene blue which he observed in the blood of animals injected with cultures of anthrax and pneumococcus. He demonstrates to his own satisfaction that these granulations are the remnants of the bacteria which have been taken up by the leucocytes. Three specimens from each of the last seven cases in the foregoing table were stained with methylene blue and carefully gone over with the mechanical stage, in order to see whether any of these granules were present. None were found, and it was not to be expected, even if the theory be correct, as few if any diphtheria bacilli enter the circulation under ordinary circumstances.

The hæmoglobin in these cases apparently suffered less reduction than in the cases without antitoxin. When a fall did take place, however, the return to normal was slow, as compared to that of the red corpuscles. Even after the child was apparently well and up and about, the hæmoglobin was below normal. This may be in part accounted for by the fact that children are confined to the house and do not get out into the open air. This pseudo-anæmia occurs in other diseases, and is often seen in the children in infant asylums. There is less need of hæmoglobin as a respiratory agent, because of the lack of exercise, fresh air and sunlight. To show that these cases are not in reality anæmic, examinations were made in six cases (19 to 24, the incomplete cases) at varying periods after the beginning of the illness; eight, nine, fourteen, fourteen, twenty-one, and fifteen days after admission, respectively. In one case (23) the number of the red corpuscles was below normal. This was a very severe case, with involvement of the eyes, and the patient was still in bed at the time of the blood examination. In four of the six cases the leucocytes were still slightly above normal. In all but two of the cases the hæmoglobin was below ninety per cent.

TABLE III.

Cases of Normal Individuals Given Antitoxin.

No.	Name.	Age.	Date and Hour.	Antitoxin.		Red Corpuscles.	Leucocytes.	Hæmoglobin, Per Cent.	Leucocytes, Per Cent.				Stained Specimens.
				c. c.	Units.				P.	L.	S.	E.	
1	W. P.	35	April 16, 11 a. m....	..	....	5,870,000	7,250	..	68.2	4.8	25.6	1.4	Negative.
			" 16, 12.30 p. m.	10	1,000	....	......	..	..	..	..	..	
			" 16, 12.40 p. m.	..	....	5,596,000	7,000	..	59.8	7.8	30.3	2.1	
			" 16, 1.30 p. m.	..	....	5,668,000	8,100	..	69.2	7.3	21.8	1.8	
			" 16, 5.15 p. m.	..	....	5,684,000	14,330	..	63.2	7.7	28.4	.7	
			" 17, 11 a. m....	..	....	5,114,000	6,950	..	..	..	..	..	
			" 18, 11 a. m....	..	....	5,080,000	7,900	..	63.8	6.2	28.6	1.4	
			" 19, 12 m......	..	....	4,896,000	7,630	..	..	..	..	..	
			" 22, 12 m......	..	....	5,104,000	6,300	..	68	5.8	25.3	.9	
			" 26, 12 m	..	....	5,001,000	9,210	..	..	..	..	..	
			May 2, 11 a. m....	..	....	5,472,000	8,000	..	..	..	..	..	
			" 13, 12 m......	..	....	6,120,000	9,000	..	..	..	..	..	
2	C. P.	9	" 17, 11 a. m....	..	....	5,600,000	7,000	98	73	7	19	1	"
			" 17, 12 m......	4	400	....	......	..	..	..	..	..	
			" 17, 12.30 p. m.	..	....	5,581,000	4,900	98	70	8	20	2	
			" 18	..	....	5,400,000	8,500	98	75	6	18	1	
			" 22	..	....	5,024,000	6,300	97	72	8	18	2	
			" 27	..	....	5,537,000	7,300	97	..	..	..	..	
3	T. M.	8	" 27, 11 a. m....	..	....	6,040,000	5,500	102	71	10	17	2	"
			" 27, 12 m......	1	125	....	......	..	..	..	..	..	
			" 27, 12.30 p. m.	..	....	5,921,000	5,000	93	70	9	20	1	
			" 28	..	....	5,973,000	7,500	98	70	9	19	2	
			" 29	..	....	5,498,000	7,200	94	74	8	18	0	
			June 1	..	....	5,960,000	6,300	99	..	..	..	..	
4	P. S.	7	May 25, 11 a. m....	..	....	5,223,000	6,000	95	75	5	19	1	"
			" 25, 12 m......	2	200	....	......	..	..	..	..	..	
			" 26	..	....	5,248,000	7,310	94	73	6	20	1	
			" 28	..	....	5,193,000	6,700	96	..	..	..	..	
5	F. L.	6	May 27, 11 a. m....	..	....	5,152,000	6,500	91	73	7	19	1	"
			" 27, 12 m......	1	125	....	....	..	..	..	..	..	
			" 28	..	....	5,713,000	4,300	89	70	9	20	1	
			" 29	..	....	5,081,000	3,200	92	..	..	..	..	
6	D. L.	14	" 27, 11.30......	..	....	5,602,000	5,800	94	74	8	17	1	"
			" 27, 12 m......	1	125	....	....	..	..	..	..	..	
			" 28	..	....	5,713,000	7,800	93	72	9	17	2	
			" 29	..	....	5,600,000	7,400	96	..	..	..	..	
			June 1	..	....	5,554,000	6,800	95	..	..	..	..	
7	J. F.	11	May 27, 11 a. m....	..	....	6,048,000	6,900	98	73	6	19	2	"
			" 27, 12 m......	1	125	....	....	..	..	..	..	..	
			" 28	..	....	6,003,000	6,300	95	73	9	17	1	
			" 29	..	....	5,712,000	2,100	99	..	..	..	..	
			June 1	..	....	5,981,000	7,300	98	..	..	..	..	

No.	Name.	Age.	Date and Hour.	Antitoxin.		Red Corpuscles.	Leucocytes.	Hæmoglobin, Per Cent.	Leucocytes, Per Cent.				Stained Specimens.
				c. c.	Units.				P.	L.	S.	E.	
8	A. R.	10	May 17, 11 a.m....	..	....	5,732,000	6,200	100	77	5	17	1	Negative.
			" 17, 12 m......	2	200	....	....	..	..	..	..	..	
			" 18	..	....	5,513,000	9,000	98	73	6	21	0	
			" 22	..	....	4,800,000	4,100	84	..	..	..	..	
			" 27	..	....	5,271,000	8,100	89	70	8	21	1	
			" 31	..	....	5,612,000	7,200	97	..	6	..	..	
9	N. W.	12	" 18, 11 a.m....	..	....	5,116,000	7,300	96	74	..	18	2	"
			" 18, 12 m......	3	300	....	....	..	..	..	..	..	
			" 19	..	....	5,200,000	6,350	95	76	8	13	3	
			" 22	..	....	4,640,000	8,250	90	74	5	19	2	
			" 27	..	....	5,098,000	8,950	94	..	..	..	..	
10	A. B.	9	" 25, 11 a.m....	..	....	5,217,000	7,200	97	69	9	21	1	"
			" 25, 12 m......	2	200	....	....	..	..	..	..	..	
			" 27	..	....	5,187,000	8,400	95	71	6	20	3	
			" 28	..	....	5,024,000	4,700	92	..	..	..	..	
			June 1	..	....	5,301,000	6,300	96	..	..	..	..	
11	C. R.	11	May 25, 11 a.m....	..	....	5,501,000	6,000	91	78	2	18	2	"
			" 25, 12 m......	2	200	....	....	..	..	..	..	..	
			" 27	..	....	5,631,000	7,250	92	76	3	21	0	
			" 28	..	....	5,472,000	2,500	90	..	..	..	..	
			June 1	..	....	5,401,000	9,500	90	..	..	..	..	
12	M. C.	10	May 25, 11 a.m....	..	....	5,650,000	4,900	88	70	8	21	1	"
			" 25, 12 m......	2	200	....	....	..	..	..	..	..	
			" 27	..	....	5,580,000	7,300	90	73	9	17	1	
			" 28	..	....	5,622,000	5,100	91	..	..	..	..	
13	J. S.	10	" 26, 11 a.m....	..	....	5,603,000	4,800	94	78	2	18	2	"
			" 26, 12 m......	2	240	....	....	..	..	..	..	..	
			" 28	..	....	5,430,000	5,800	94	80	2	17	1	
			" 29	..	....	5,596,000	6,850	94	..	..	..	..	
14	C. L.	9	" 28, 11 a.m....	..	....	6,688,000	4,500	101	79	5	13	3	"
			" 28, 12 m......	1	125	....	....	..	..	..	..	..	
			" 29	..	....	6,431,000	8,300	100	78	3	18	1	
			" 30	..	....	6,018,000	6,800	97	..	..	..	..	
			June 2	..	....	6,507,000	4,900	100	..	..	..	..	
15	P. T.	8	May 28, 11 a.m....	..	....	5,830,000	7,300	90	76	6	15	3	"
			" 28, 12 m......	1	125	....	....	..	..	..	..	..	
			" 29	..	....	5,720,000	8,100	91	71	4	24	1	
			" 30	..	....	5,613,000	4,600	86	78	6	15	1	
			June 3	..	....	5,850,000	5,900	92	..	..	..	..	

Remarks on Table III.—All the above cases, with the exception of one, were seen at the New York Juvenile Asylum. All were males and apparently healthy. The injections were given into the subcutaneous tissue of the abdominal wall. The corpuscles were counted in all the cases within an hour before the administration of the antitoxin. In the first three cases the blood was again counted an hour after the injection, but as no change was observed, an interval of twenty-four hours was allowed to elapse in all the other cases. A diminution in the number of the red corpuscles was noted in seven of the fifteen cases (1, 2, 3, 7, 8, 9 and 15). This diminution was most marked between the second and sixth day after injection, and ranged between 974,000 and 217,000 per cubic millimetre. The fall of 974,000 was in Case 1, the only adult in the series. Case 8 was the only other one to show any considerable fall (932,000 per cubic millimetre by the fifth day). The diminution in all the other cases was less than 600,000 per cubic millimetre.

The case receiving the largest amount of serum and the greatest number of antitoxin units was the one to show the most marked reduction in the number of the red corpuscles (Case 1). Case 2, receiving four cubic centimetres and four hundred units, showed a distinct reduction of half a million. All the other cases received small amounts of serum containing a relatively small amount of antitoxin. Some of these cases showed a reduction in the number of red corpuscles, some did not. The red corpuscles returned to their normal number in from four to thirteen days. Case 1 apparently did not do so for twenty-four days, but an interval of eleven days preceded the last count. The data furnished by the above cases are all too few to enable us to draw any conclusions as to the effect of the amount or strength of the serum upon the corpuscles. Microscopical examination revealed no abnormalities in the red corpuscles.

The leucocytes appeared to be absolutely unaffected by the injections. They rose to a point above normal in only one case (Case 1). Of the three cases examined directly after the injections, a fall in the number of the leucocytes was noted in only one instance (Case 2). In determining the presence or absence of a hypoleucocytosis, we are dealing with such small figures and such varying conditions that a large number of mutually agreeing observations are necessary.

In the stained specimens the relative numerical proportions of the various forms of leucocytes were apparently normal in all cases. No variations from the normal in the staining properties of the nuclei or of the granules could be made out.

The hæmoglobin was apparently affected to a less degree than the red corpuscles. It fell below eighty-five per cent. in only one case. But the diminution in the number of the red corpuscles was confirmed by the fall in the hæmoglobin in each case where such diminution took place.

Summary.

1. The red corpuscles of the blood in diphtheria undergo a dimunition in number in cases of moderate severity and in severe cases. Regeneration is slow.

2. The leucocytes are increased in number in all but two classes of cases, exceptionally mild cases and exceptionally severe ones. As a rule, the amount of leucocytosis is directly proportionate to the degree of severity of the case. The leucocyte curve shows no correspondence to the clinical course of the disease. The number of leucocytes often remains higher than normal for days after all inflammatory phenomena have disappeared. The leucocytosis is similar in character to that seen in pneumonia and scarlet fever; the increase of the leucocytes being in the so-called polynuclear forms.

3. The percentage of hæmoglobin falls coincidently with the number of the red corpuscles, and to the same relative degree. But the regeneration of the hæmoglobin takes place much more slowly than that of the red corpuscles.

4. In cases treated with antitoxin the diminution in the number of the red corpuscles is much less marked than in those cases treated without it; in a majority of the cases no such diminution takes place. The leucocytes are apparently unaffected by the antitoxin. The hæmoglobin is also much less affected in the cases treated with antitoxin, thus confirming the statement as to the red corpuscles.

5. In healthy individuals injected with antitoxin, the red corpuscles show a very moderate reduction in number in about one-half the cases. The hæmoglobin is correspondingly affected. The leucocytes are apparently unaffected by the injections.

6. No peculiar characteristic changes in the morphology of the corpuscles were to be made out.

7. It is improbable that any information of prognostic importance is to be gained by examination of the blood in diphtheria.

8. The antitoxin treatment of diptheria has no deleterious effects upon the blood corpuscles. On the contrary, it seems to prevent degenerative changes which would otherwise be brought about.

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THE USE OF ANTITOXIN SERUM IN THE TREATMENT OF DIPHTHERIA UNDER THE SUPERVISION OF THE NEW YORK CITY HEALTH DEPARTMENT, WITH A RÉSUMÉ OF THE PUBLISHED REPORTS ON THIS SUBJECT.

BY

HERMANN M. BIGGS, M. D.,

Pathologist and Director of the Bacteriological Laboratories, New York Health Department.

AND

ARTHUR R. GUERARD, M. D.,

Assistant Bacteriologist.

On January 1, 1895, the New York City Health Department commenced the use of the diphtheria antitoxin prepared in the bacteriological laboratories. For about six weeks after this date, however, the serum at command was limited in amount and was not of a satisfactory strength. The supply of foreign preparations of antitoxin at this time was very small; only a few vials could be obtained under any conditions, and the prices charged were exorbitant, averaging about 80 cents per 100 antitoxin units (Behring's standard), or from $8 to $12 a dose. The price of similar preparations now, as furnished by the Health Department is from 75 cents to $1.50, or 10 cents per 100 units.

The serum prepared in the laboratories of the Health Department was first employed in the hospitals, but as soon as a sufficient quantity was at hand, arrangements were made for its administration without charge, on the request of the attending physician, by Medical Inpectors detailed for this purpose, in any case of diphtheria occurring in the city. During the period ending October 1, 1896, 1,352 cases regarded as diphtheria were treated in their homes by Inspectors of the Department, at the request of the attending physicians, and 1,207 persons (excluding inmates of public institutions), who had been exposed to diphtheria, were immunized by the administration of antitoxin. Altogether, more than 3,000 injections of antitoxin have been administered, and about 6,000 visits made. This duty has been mainly performed by Medical Inspectors Drs. H. F. Koester, W. E. Studdiford, J. S. Ennis, L. K. Graves and W. J. Pulley.

The cases referred to above do not include any of those treated in the various institutions of the city, and were, as a rule, among the very poorest classes in the tenement-house districts. They have, generally speaking, been in the most unfavorable surroundings; have been severe cases, or regarded by the physicians in attendance as hopeless cases, and have usually come under observation rather late in the course of the disease. In some of the later cases, however, the reverse of this may be said, as physicians who had seen the effects of antitoxin on the course of diphtheria, and had thus been convinced of its value, not infrequently referred comparatively mild cases for treatment at an early period of the disease. It will be noted by reference to the accompanying tables that, during the first year of this work, up to April 1, 1896, about 8 per cent. of the cases treated were moribund when first seen by the Inspectors, while in the last six months the percentage has been reduced to about one-half of this number. In a large proportion of the whole number there was practically no other treatment besides the administration of antitoxin. In some cases strychnia, whiskey and other remedies were also given. In many instances the physician in attendance discontinued his visits, after referring the case to the Health Department for the administration of antitoxin, as the family was unable to pay for his attendance.

There has been from the beginning a continuous and marked improvement in the results obtained, in consequence, it is believed, of increased experience in the use of this agent, the earlier application of the treatment, the constant improvement in the character of the serum, and the larger dosage employed. During the first year (see Table No. I.) the mortality was seventeen and nine-tenths per cent., while during the last six months the mortality was only eleven and one-tenth per cent.

For the execution of the plan adopted for the free administration of antitoxin among the poor, the city was divided into districts, each district being placed in the charge of an Inspector, who is always on duty and liable to call at any hour during the day or night. The requests for the administration of antitoxin are received in the offices of the Health Department, and immediately referred by police telegram, or by telephone, to the Inspector in charge of the district in which the case occurs. In some instances during the last months, where several cases have been treated by the same physician, they have been referred by him directly to the Inspector, in order that valuable time might thus be saved.

There were treated up to October 1, all included, 1,352 cases regarded as diphtheria. Of hese 100 cases showed later, on bacteriological examination, no Loeffler baccilli—were considered s false diphtheria and excluded from the statistics, or were found to be true diptheria, were ater transferred to the Willard Parker Hospital, and thus passed from observation of the Inspector, r the treatment was discontinued from some other cause. There remain 1,252 cases, of which ,054 recovered and 198 died, the mortality being 15.8 per cent. Of the whole number 856 were reated previous to April 1, 1896, and among these the mortality was 17.9 per cent. Three hundred and ninety-six were treated during the period between April 1 and October 1, and among hese the mortality was 11.1 per cent. While the difference in the results may be in part due to he season of the year, yet this does not satisfactorily account for the whole difference in mortality, s reference to the monthly mortality curve of the city will show that there was not a corresponding eduction in the general mortality during the latter months.

Of the 1,252 cases, 80 were moribund at the time of first injection, or died within twenty-four ours after it. These may be properly excluded in a consideration of the utility of antitoxic serum n the treatment of diphtheria. There remain 1,172 cases with 118 deaths, or a mortality of 10 er cent. Five hundred and seventy-four, or nearly one-half of the whole number, were reported y the Inspectors to be in a bad condition and suffering from very severe or septic diphtheria at the ime of the first injection, and 268, or about 21 per cent., were reported as in good condition, r as apparently affected with a mild form of the disease when first seen. In 355, or more than 28 er cent. of the whole number, the larynx, with or without the pharynx, tonsils and nares, was volved. In 242 cases, in addition to the pharynx and tonsils, the nares were involved. One undred and eight deaths occurred among 355 laryngeal cases, giving a mortality of 30.4 per cent. eventy-two of the laryngeal cases were intubated, in some instances by the Inspectors, and in me by the attending physicians, and of these 29 died, or 40.2 per cent. In 283 laryngeal cases ere was no operative interference, and in these the mortality was 27.9 per cent. Of the fatal ryngeal cases, 38 were moribund at the time of the first injection, or died within twenty-four ours after it. If these be excluded, there remain 317 cases with 70 deaths, or a mortality of 22 er cent. Other data as to the mortality inoperative and non-operative cases, and as to the results relation to the age of the patient, and the day of the disease on which treatment was begun, e shown in detail in the accompanying tables. (Tables Nos. I., II. and III.)

TABLE I.

ases of Diphtheria Treated with Antitoxin by the Health Department, January 1, 1895, *to October* 1, 1896.

otal cases of true diphtheria injected with antitoxin by the Medical Inspectors of the Health Department, showing the number of cases injected and the mortality percentage, prognosis at the time of injection, extent of membrane in the throat, complications and number of injections given.

	Cases.	Deaths.	Mortality, Per Cent.	PROGNOSIS.			EXTENT OF MEMBRANE.			
				Good.	Fair.	Bad.	Tonsils	And Pharynx.	And Nose.[1]	Larynx.[2]
nuary 1, 1895, to April 1, 1896	856	154	17.9	148	261	447	170	280	145	261
pril 1, 1896, to October 1, 1896	396	44	11.1	120	148	128	114	91	97	94
Totals	1,252	198	15.8	268	409	575	284	371	242	355
oribund cases, or those dying within 24 hours, deducted.	80	...	....	...	...	...	...	...	...	...
There remain	1,172	118	10.0	...	...	...	...	...	...	...

TABLE I.—(*Continued*).

	COMPLICATIONS.[3]				NUMBER OF INJECTIONS GIVEN.					Total Injections Given.	NUMBER OF ANTITOXIN UNITS INJECTED.
	Broncho-pneumonia.	Nephritis.	Sepsis.	Paralysis.	1	2	3	4	5		
January 1, 1895, to April 1, 1896	8	35	136	7	559	230	60	8	..	1,231	600 to 2,500
April 1, 1896, to October 1, 1896	8	5	66	6	234	122	32	8	1	611	600 to 3,000
Totals	16	40	202	13	793	352	92	16	1	1,842	600 to 3,000

NOTES TO TABLE I.—From January 1, 1895, to April 1, 1896, there were treated 856 cases, with 154 deaths, giving a mortality of 17.9 per cent. Of these 65 were moribund at the time, or died within twenty-four hours after injection; deducting these, the mortality was 11.2 per cent. From April 1 to October 1, 1896, there were treated 396 cases, with 44 deaths, or a mortality of 11.1 per cent. Of these 15 were moribund, or died within twenty-four hours after injection, and, deducting these, the mortality for the last six months was 7.6 per cent. The total mortality from January 1, 1895, to October 1, 1896, (1,252 cases and 198 deaths), was 15.8 per cent.; deducting the moribund, it was 10 per cent.

[1] In the nasal cases the pharynx and tonsils were also involved, as a rule.

[2] The larynx involved, with or without the pharynx and nose.

[3] Only the common and more important complications of diphtheria are noted here, and these notes are incomplete. Many other complications occurred (notably scarlet fever) and acted as contributory or determining causes of death. These fatal cases are all included.

TABLE II.

Cases of Laryngeal Diphtheria Treated with Antitoxin by the Health Department, January 1, 1895, *to October* 1, 1896.

Total cases of Laryngeal Diphtheria injected with antitoxin by the Medical Inspectors of the Health Department, showing the number of cases injected, and the cases, deaths and mortality percentage in both operative and non-operative cases.

	TOTAL LARYNGEAL CASES.			NON-OPERATIVE CASES.			OPERATIVE CASES (INTUBATION).		
	Cases.	Deaths.	Mortality, per cent.	Cases.	Deaths.	Mortality, per cent.	Cases.	Deaths.	Mortality, per cent.
January 1, 1895, to April 1, 1896	261	87	33.3	197	58	29.4	64	29	45.3
April 1, 1896, to October 1, 1896	94	21	22.2	86	21	25.5	8	0	0.
Totals	355	108	30.4	283	79	27.9	72	29	40.2
Moribund, or dying within 24 hours, deducted.	38	..	....	34	..	....	4	..	....
There remain	317	70	22.0	249	45	17.9	68	25	36.7

NOTES TO TABLE II.—From January 1, 1895, to April 1, 1896, there were 261 laryngeal cases injected, resulting in 87 deaths, or a mortality of 33.3 per cent. Of these 25 were moribund at the time, or died within twenty-four hours after injection, and, deducting these, the mortality was 26.2 per cent. Of the 64 cases intubated, resulting in 20 deaths, or a mortality of 45.3 per cent., 4 were moribund at the time; deducting these, the mortality of operated cases was 41.6 per cent; 197 cases, resulting in 58 deaths, were not operated upon, and of these the mortality was 29.4 per cent.; deducting 21 moribund at the time, or dying within twenty-four hours after injection, the mortality for non-operative cases was 21 per cent. From April 1 to October 1, 1896, there were 94 laryngeal cases injected, resulting in 21 deaths, or a mortality of 22.2 per cent. Of these 13 were moribund, or died within twenty-four hours after injection, deducting which would give a mortality of 11.1 per cent. Of the 8 cases intubated, none died. There were 86 cases not operated on, resulting in 21 deaths, or a mortality of 25.5 per cent.; deducting the 13 moribund cases, or those dying within twenty-four hours, the mortality was only 9.8 per cent. According to the reports of the Inspectors, many more of the laryngeal cases might have been saved by earlier treatment and intubation. The total mortality of laryngeal cases from January 1, 1895, to October 1, 1896, (355 cases and 108 deaths), was 30.4 per cent.; deducting the moribund, it was 22 per cent.

TABLE III.

Cases of Diphtheria Treated by the Health Department, Arranged According to Age and Day of Disease when Injected, January 1, 1895, *to October* 1, 1896.

	Age.									Totals.	Moribund, or dying within 24 hours, deducted.	Remaining.
	0-1 Year.	1-2 Years.	2-3 Years.	3-4 Years.	4-5 Years.	5-10 Years.	10-15 Years.	15-20 Years.	Over 20 Years.			
Cases	74	214	252	189	182	260	45	13	23	1,252	80	1,172
Died	21	51	43	30	26	26	0	1	0	198	..	118
Mortality, per cent	28.3	23.8	17.0	15.9	14.2	10.0	0.0	8.0	0.0	15.8	....	10.0

	Day of Disease.												Total.		
	First Day.		Second Day.		Third Day.		Fourth Day.		Fifth Day, or Later.		Unknown.				
	Cases.	Died.	Cases.	Died.	Cases.	Died.	Cases.	Died.	Cases.	Died.	Cases.	Died.	Cases.	Died.	Mortality, per cent.
Cases and deaths	157	11	331	30	293	42	197	39	262	72	12	4	1,252	198	....
Mortality, per cent	..	7.0	..	9.0	..	14.3	..	20.0	..	27.4	..	33.3	....	..	15.8
Moribund or dying within 24 hours, deducted	5	..	14	..	17	....	15	....	25	....	4	....	80	..	....
There remain	152	6	217	16	276	25	182	24	237	47	8	0	1,172	118	....
Mortality, per cent	..	4.0	..	5.4	..	9.0	..	13.2	..	20.0	..	0.0	....	..	10.0

NOTES TO TABLE III.—The total mortality of those injected within the first forty-eight hours of the disease was 8.2 per cent; deducting the moribund, or those dying within twenty-four hours after injection, 4.3 per cent. The mortality of those injected before the fifth day of disease was 12.4 per cent.; deducting the moribund, 7.6 per cent. During the last six months, April to October, there were injected within the first forty-eight hours of disease, 178 cases, with 8 deaths, a mortality of 4.5 per cent.; deducting the moribund, 1.6 per cent. Before the fifth day of disease, there were injected 317 cases, with 22 deaths, a mortality of 6.9 per cent.; deducting the moribund, 3.6 per cent.

In a large majority of all cases treated—*i. e.*, 793—only one injection of antitoxin was administered; in 352 two injections were made, and in 106 three or more. In all severe cases the initial dose was large, varying from 1,500 to 3,500 units, experience showing that the best results were obtained from large initial doses, and the tendency has been to constantly increase the size of this dose. This experience is in direct confirmation of the conclusions reached in the experimental investigations on animals. As a rule the patients were seen a second time at the end of twenty-four hours, and where it was considered necessary a second injection was then administered. They were afterward seen at intervals until the disease had terminated either in complete convalescence or death.

The serum employed has been generally of high grade, and during the last nine months has been at least twice as potent as Behring's No. 3; that is, it contained 300 or more antitoxin units in each cubic centimetre. During the past three months the serum employed contained from 400 to 500 units in each c. cm. Better results have been obtained with the high-grade preparations, and with larger doses. In the earlier months, where larger quantities of serum were administered (the serum containing proportionately less antitoxin), rashes were of frequent occurrence; but no reliable data as to the percentage of cases in which they appeared can be obtained. There has been a considerable diminution in the frequency with which rashes have occurred, and in the severity of these, since the use of the higher grade preparations of antitoxin in which smaller doses of serum are employed. Joint symptoms were of very unusual occurrence. In five instances abscesses followed the administration of the serum; but in none of these could the abscess be properly charged to the serum itself. In two or three of the early cases where large immunizing injections where employed, severe joint symptoms, accompanied by prostration and pyrexia, occurred, and in a number temporary (twenty-four to seventy-two hours) albuminuria appeared. Aside from the symptoms referred to, and occasionally a temporary pyrexia, no disagreeable effects in any way attributable to the antitoxin were observed. No case has come under observation where death could be ascribed to the administration of the serum, or where any permanent injury could be properly regarded as having been produced by it.

The data as regards complications are very incomplete, as in the class of patients treated and under the conditions existing, careful observations could not be made. Only the more common complications of diphtheria are noted; in many instances other serious complications existed (notably scarlet fever), and acted as contributing or determining causes of deaths in fatal cases. All such cases have been included.

In all of the cases, with rare exceptions, in which the clinical features were unmistakable, the clinical diagnosis was confirmed by bacteriological examination. In a few cases the result of the bacteriological examination was indecisive, while the case was evidently diphtheria, and these have been included. In others bacteriological examination showed clearly that the case was false diphtheria, and such cases have been excluded from the list. The usual practice has been when a case was seen for the first time by the Inspector (at the request of the attending physician) to administer an injection of antitoxin, if it seemed clinically to be a case of diphtheria, and at the same time to make a culture from the throat for bacteriological examination, if a culture had not been previously made. The course subsequently pursued in each case depended upon the results of the bacteriological examination.

When cases of diphtheria were seen in families in which there were other children who had been exposed to the disease, and when the parents would allow it, an immunizing injection was administered to each of them, and trial cultures were made from their throats. In a large percentage of these cases the cultures showed the presence of Loeffler bacilli.

Immunizing injections, varying from 50 to 500 units in amount, were administered to 1,207 persons (see Table IV.). In five children who had been immunized, laryngeal diphtheria (croup) developed within twenty-four hours of the time of the injection, and in seven others pharyngeal diphtheria appeared. All of these cases received further curative injections and promptly recovered. In nine cases diphtheria developed within thirty days of the time of immunization. All of these cases, excepting two, were mild and promptly recovered. In one of these two exceptions, scarlet fever, apparently accompanied by diphtheria, developed on the second day, and the child died.

No data of value are at command regarding the occurrence of cases of diphtheria after thirty days among those immunized; but in one instance it is known that a child developed diphtheria on the twenty-fifth day after immunization, and, although it received a curative injection, it nevertheless died from the disease. The experience obtained from the immunization of children in various institutions indicates that the protective influence of the immunizing injections cannot be depended upon to last longer than about four weeks, although in many cases the period is apparently longer. With the high-grade preparations of antitoxin now employed the amount of serum required for an immunizing injection is very small, varying from 3 to 10 or 15 minims, according to the age of the patient and the strength of the preparation. In the earlier work, when young and feeble infants were immunized, some restlessness, accompanied by more or less pyrexia, occurred in many cases during the first twenty-four hours, and not infrequently a rash appeared later. Similar symptoms appeared in a smaller proportion of instances in adults. In a few cases transient albuminuria occurred. Since the employment of only very small doses of serum it has been unusual to see any disturbances following the administration of an immunizing injection. In one group of about forty cases recently immunized with small doses, in only one instance was there a local rash near the seat of the injection. In another series of 130 cases, immunized in an infant asylum,[1] in which relatively large doses were administered to infants varying in age from 1 day up, in only 7 cases was there a mild body-rash, and in 42 a local arm-rash, and in no instances were there other sequelæ.

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[1] Among injections made at this asylum were cases: No. 117, an infant, three weeks old, born at full term, injected with 150 units, and weighing at the time of injection only four pounds three ounces; and No. 123, a premature infant, nineteen days old, born at seventh month, and still in an incubator, injected with 150 units, and weighing at the time of injection only three pounds eight ounces. These infants had no reaction whatever and no rash.

Among the pregnant women:
10 were eight months in pregnancy.
2 were eight and a half months in pregnancy.
9 were nine months in pregnancy.

TABLE IV.

Immunization with Antitoxin by the Health Department Inspectors, January 1, 1895, *to October* 1, 1896.

Table of cases immunized with injections of antitoxin in families where diphtheria had occurred, showing the number of cases immunized, the number of antitoxin units injected, the number of cases of diphtheria which occurred within thirty days after injection, the number of cases which occurred after thirty days and within twenty-four hours after injection, and the number of cases of diphtheria which occurred in the families previous to immunization :

Number of Cases Immunized.	Number of Antitoxin Units Injected.	NUMBER OF CASES OF DIPHTHERIA WITHIN 30 DAYS AFTER INJECTION.	NUMBER OF CASES OF DIPHTHERIA WITHIN 24 HOURS AND AFTER 30 DAYS AFTER INJECTION.	Number of Cases of Diphtheria which occurred in Families, etc., Previous to Immunization.
1207	50 to 500	1 on the 7th day[1] .... Mild. 1 " 10th day .... Mild. 5 " 19th and 20th days.... Mild. 1 " 23d day .... Mild. 1 " 30th day .... Mild. 1 severe on the 5th day recovered. 1 on the 2d day died of scarlet fever and diphtheria.	After 30 days : 2 mild recovered.[2] 1 on 55th day died. Within 24 hours : 7 mild pharyngeal. 5 croup, all recovered.	One or more cases in 395 families.

[1] Probably had nasal diphtheria at the time of immunization.

[2] The data as to cases occurring after thirty days have but little value, as cases might have appeared without the knowledge of the Health Department.

On October 1, 1895, arrangements were made to enable physicians to obtain supplies of antitoxin free, for use among patients too poor to pay for the remedy, on condition that the reports of the cases thus treated should be furnished to the Health Department. Druggists, acting as agents for the sale of antitoxin, were instructed to furnish the remedy free to any physician, upon his statement that the patient for whom it was intended was not in circumstances to pay for it. A blank was furnished upon which the history of the case could be filled out by the attending physician upon the termination of the case, either by death or complete recovery, and then forwarded to the Health Department.

This arrangement has not been very generally known, and has not been largely utilized by physicians until quite recently, and in many of the cases thus treated the complete report has not been obtained. Up to October 1, 1896, 409 cases of this sort have been reported, of which 34 proved, on bacteriological examination, to be cases of false diphtheria, were transferred to the Willard Parker Hospital, or had histories too incomplete for proper tabulation, and are, therefore, excluded ; of the remaining 375, 307 recovered and 68 died, a mortality of 18.1 per cent.

The fuller data regarding these cases, as furnished by the attending physician, will be found in the accompany tables (Nos. V., VI. and VII).

TABLE V.

Cases Treated by Physicians with Free Antitoxin, collated from the Reports of the Attending Physicians, October 1, 1895, *to October* 1, 1896.

	Cases.	Deaths.	Mortality, per cent.	EXTENT OF MEMBRANE.				NUMBER OF INJECTIONS.				Total Injections given.
				Tonsils.	Pharynx.	Nose.	Larynx.	1	2	3	4	
October 1, 1895, to April 1, 1896.....................	86	15	17.2	12	32	9	33	69	16	0	0	101
April 1, 1896, to October 1, 1896....................	289	53	18.3	88	58	49	94	238	49	1	1	343
Totals	375	68	18.1	100	90	58	127	307	65	1	1	444
Moribund, or dying within 24 hours, deducted......	21	..	....	...	..	..	...	...	..	.	.	...
There remain	354	47	13.2	...	..	..	...	...	..	.	.	...

NOTES TO TABLE V.—From October 1, 1895, to April 1, 1896, there were treated with free antitoxin 86 cases resulting in 15 deaths, or a mortality of 12.2 per cent. Of these 3 were moribund at the time of injection, or died within twenty-four hours after the first injection, deducting. which would give a mortality of 14.4 per cent. In 60 cases the diagnosis was bacteriologically confirmed, and of these 6 died, or 10 per cent. ; 56 cases were clinically diagnosed, of which 9 died, or 37.5 per cent. From April 1, 1896, to October 1, 1896, there were treated 289 cases, resulting in 53 deaths, or a mortality of 18.3 per cent. Of these 18 were moribund at the time of injection, or died within twenty-four hours after the first injection, deducting, which would give a mortality of 12.9 per cent. In 241 cases the diagnosis was bacteriologically confirmed (in 24 cases the examination was indecisive), and of these 35 died, or 14.5 per cent.; 48 cases were clinically diagnosed, and of these 18 died, or 37.4 per cent. Of the 289 cases treated, 60 occurred in institutions, with 9 deaths, or 15 per cent. mortality.

Of the entire number of cases reported, 34 cases are excluded from the statistics on account of imperfect data in the reports, or no Klebs-Loeffler bacilli being found, or the cases being removed to the Willard Parker Hospital and treatment discontinued. In a total of 375 cases treated by physicians with free antitoxin from October 1, 1895, to October 1, 1896, there were 68 deaths, or a mortality of 18.1 per cent.; deducting 21 cases which were moribund at the time or died within twenty-four hours after the first injection, there were 354 cases, with 47 deaths, or a mortality of 13.2 per cent. Of the total number treated, in 100 cases the tonsils alone were involved; in 90 cases the pharynx alone, or tonsils and pharynx; in 58 cases the nose alone, or nose, pharynx and tonsils; in 127 cases the larynx was involved, either alone or in combination with tonsils, pharynx and nose. In this table the prognosis at the time of treatment and the complications accompanying or following the injections are not included, because the data given in the reports were insufficient or incomplete.

TABLE VI.

Laryngeal Cases Treated by Physicians with Free Antitoxin, October 1, 1895, *to October* 1, 1896

	TOTAL LARYNGEAL CASES.			NON-OPERATIVE CASES.			OPERATIVE CASES (INTUBATION).		
	Cases.	Deaths.	Mortality, Per Cent.	Cases.	Deaths.	Mortality, Per Cent.	Cases.	Deaths.	Mortality, Per Cent.
October 1, 1895, to April 1, 1896	33	12	36.3	23	7	30.4	10	5	50
April 1, 1896, to October 1, 1896	94	25	26.6	62	16	25.8	32	9	28.1
Totals	127	37	29.1	85	23	27	42	14	33.3
Moribund, or dying within 24 hours, deducted.	11	..	....	6	..	....	5	..	....
There remain	116	26	22.4	79	17	21.5	37	9	24.3

NOTES TO TABLE VI.—From October 1, 1895, to April 1, 1896, there were 33 laryngeal cases treated with free antitoxin, resulting in 12 deaths, or a mortality of 36.3 per cent.; 23 cases were not operated on, with 7 deaths, or a mortality of 30.4 per cent.; 10 cases were intubated, resulting in 5 deaths, or a mortality of 50 per cent.

From April 1, 1896, to October 1, 1896, there were 94 laryngeal cases treated with free antitoxin, resulting in 25 deaths, or a mortality of 26.6 per cent. Of these, 10 were moribund at the time, or died within twenty-four hours, deducting which, the mortality would be 17.8 per cent.; 62 cases were not operated on, with 16 deaths, or a mortality of 25.8 per cent.; of these, 6 were moribund at the time or died within twenty-four hours, deducting which would reduce the mortality to 17.1 per cent.; 32 cases were intubated, with 9 deaths, or a mortality of 28.1 per cent.; of these 4 were moribund, or died within twenty-four hours, deducting which would reduce this mortality to 17.8 per cent. In a total of 127 laryngeal cases treated by physicians with free antitoxin, from October 1, 1895, to October 1, 1896, there were 37 deaths, or a mortality of 29.1 per cent.; of these 11 were moribund at the time of injection, or died within twenty-four hours after the first injection, and if these be deducted there remain 116 cases, with 26 deaths, or a mortality of 22.4 per cent.; 85 cases were not operated on, of which 23 died, a mortality of 27 per cent.; deducting 6 moribund, or dying within the first twenty-four hours, there remain 79 cases, with 17 deaths, or a mortality of 21.5 per cent.; 42 cases were operated on, with 14 deaths, a mortality of 33.3 per cent.; deducting 5 moribund, or dying within the first twenty-four hours, there remain 37 cases, with 9 deaths, or a mortality of 24.3 per cent.

TABLE VII.

Age and Day of Disease when Treatment by Physicians with Free Antitoxin was Commenced, October 1, 1895, *to October* 1, 1896.

	AGE.									Total.	Moribund, or dying within 24 hours, deducted.	Remaining.
	0–1 Year.	1–2 Years.	2–3 Years.	3–4 Years.	4–5 Years.	5–10 Years.	10–15 Years.	15–20 Years.	Over 20 Years.			
Cases	23	39	76	86	37	89	14	1	10	375	21	354
Died	5	15	19	13	6	9	1	0	0	68	..	47
Mortality, per cent.	21.8	38.4	25.0	15.1	16.2	10.1	7.1	0.0	0.0	18.1	..	13.2

TABLE VII.—(*Continued*).

	Day of Disease.												Total.		
	First Day.		Second Day.		Third Day.		Fourth Day.		Fifth Day, or Later.		Unknown.				
	Cases.	Died.	Cases.	Died.	Cases.	Died.	Cases.	Died.	Cases.	Died.	Cases.	Died.	Cases.	Died.	Mortality, per cent.
and deaths....	45	4	101	17	77	8	53	9	67	25	32	5	375	68	....
lity, per cent..	..	8.8	...	16.8	..	10.3	..	17.0	..	37.3	..	15.9	...	..	18.1
und, or dying in 24 hours, deed...........	1	..	6	....	4	....	3	....	5	....	2	....	21	..	....
re remain	44	3	95	11	73	4	50	6	62	20	30	3	354	47	....
lity, per cent..	..	6.7	...	11.5	..	5.5	..	12.0	..	32.2	..	10.0	...	..	13.2

otes to Table VII.—From October 1, 1895, to April 1, 1896, there were treated within the first four days ase 61 cases, with 6 deaths, or a mortality of 10 per cent.; of these 3 were moribund, or died within twenty-ours, deducting which the mortality would be 5.1 per cent. From April 1, 1896, to October 1, 1896, there reated within the first four days of disease 215 cases, with 32 deaths, or a mortality of 14.8 per cent.; of 11 were moribund, or died within twenty-four hours, deducting which the mortality would be 10.2 per cent. tal of 276 cases treated within the first four days of disease, there were 38 deaths, or a mortality of 13.7 per deducting the 14 moribund, or dying within the first twenty-four hours, the mortality would be 9.1 per In a total of 138 cases treated within the first three years of life, 39 died, or a mortality of 28.2 per cent. the third to the tenth year there were 212 cases treated, with 28 deaths, a mortality of 13.2 per cent. From th to the fifteenth year the mortality was 7.1 per cent. Over fifteen years, none died. Two-thirds of the treated were under ten years of age.

With a view to a more complete study of the fatal cases of diphtheria occurring in New York g the last few months, a letter has been addressed to every physician who reported a death diphtheria or croup, asking for information as to whether antitoxin was employed in the case, f so, on what day of the disease it was administered, and what was the condition of the nt at the time of administration. Personal observations on the subject were also requested.

Information has been received, between May 7 and November 1, 1896, from 306 physicians, regard to 336 fatal cases of diphtheria reported to the Board of Health; 124, or 37 per cent., ese were reported as treated with antitoxin, and 212, or 63 per cent., were reported as treated out antitoxin. The total number of deaths from diphtheria and croup reported during this d was 658. There were, therefore, 322 deaths with regard to which no information was ved in response to the letter of inquiry.

Of the 124 fatal cases treated with antitoxin, 41, or 33 per cent., were reported as moribund or less at the time of injection, or as dying within twenty-four hours after the first injection, and e the antitoxin could not have been expected to have any effect; 33 cases, or 26 per cent., injected on the fifth day of the disease, or later, when the remedy has relatively little value; ses, or 23 per cent., were complicated with sepsis, scarlet fever, measles, broncho-pneumonia—bly bad cases; and 13 cases, or 10.5 per cent., died from cardiac paralysis, sudden death, ulting from getting up too soon, contrary to instructions."

Of the 212 fatal cases where no antitoxin was used, 50, or 24 per cent., were moribund or less when first seen, and hence no antitoxin was used, as stated by the attending physician, use of the patient's condition; 33 cases, or 16 per cent., were seen too late, in the opinion of ttending physician, for antitoxin to be of any use; 17 cases refused treatment with antitoxin, gh strongly advised; and 4 cases were not injected, because, being complicated with scarlet , measles, etc., antitoxin was considered useless. In 94 cases, or 44 per cent., antitoxin was dministered, because the attending physician was opposed to its use, was doubtful of its effi-, or no reason was given. A number of physicians stated that in future they intended to use oxin owing to the bad results obtained by other methods. A very large majority of the icians from whom reports were received (over two-thirds) expressed themselves as strongly in r of the use of antitoxin in diphtheria. Many of them presented records of previous severe treated with antitoxin with good results.

A report is also presented which was prepared by Alfred L. Beebe, Ph. B., Assistant Director of the Diagnosis Bacteriological Laboratory. This includes a series of tables and charts, showing the actual and relative mortality from diphtheria and croup in New York, Berlin and Paris, previous to and following the introduction of antitoxin in these cities. Mr. Beebe's report follows:

"In accordance with your directions, the following tables and charts have been prepared from the official statistics of New York, Paris and Berlin, with a view to show the effect, if any, produced by the use of diphtheria antitoxin on the actual and relative mortality from diphtheria and croup in these cities.

"Table VIII. gives the annual actual mortality in New York from diphtheria and croup for the years 1880–1895, the case fatality from diphtheria, 1880–1890, and the case fatality from diphtheria and croup combined, 1891–1895, and from January to October, 1896. Croup was not officially classed as a contagious disease by the New York Health Department prior to 1891, and cases of this disease were therefore not required to be reported to the Department. It will be noticed that in the first two years after the reporting of croup is required the mortality from diphtheria is raised nearly 10 per cent., by the croup deaths (27.9 per cent. to 36.7 per cent. and 30.9 per cent. to 40.6 per cent.). After this the influence of the croup deaths becomes less, as in 1893 the Health Department declared that membranous croup was in the vast majority of cases laryngeal diphtheria, and would be so regarded by the Department. After this announcement the relative proportion of deaths ascribed to croup gradually diminishes, until, in 1895, the croup deaths equaled only about one-fifth of the diphtheria cases, while, in 1891 and before, they equaled from two-fifths to one-half or more the number of diphtheria deaths. In no single year until 1895 did the number of cases of croup reported equal the number of deaths. Owing to the rapidly fatal termination of the majority of cases of croup, the report of death was either the first report received by the Department, or the report of the case and the death arrived almost simultaneously.

"Bearing the above in mind, it is evident that the figures for case fatality from diptheria 1880-1890, are not comparable with those showing the combined fatality from diptheria and croup, 1891-1895. The figures for case fatality from diphtheria alone are relatively lower from 1891-1895 than before, as is shown by the table, and as the figures for case fatality from diphtheria and croup combined undoubtedly show the true mortality in diphtheria, they are absolutely, as well as relatively, too low for these years. On the other hand, progressing backward in the scale of years, an increasing percentage of cases of diphtheria was not reported, and the fatalities for these years are therefore higher than the truth, especially in the earlier years for which figures are given. Taking all the facts into consideration, it seems probable that, for the earliest years for which figures are given, the case fatalities for diphtheria alone are somewhat too high; that for the years immediately preceding 1891 they are too low; while for the immediate years they are more nearly correct.

"Before considering these figures, and those in other tables relating to New York, it should be stated that antitoxin was first introduced to a very limited extent from abroad in November, 1894. In January, 1895, the distribution and use of the antitoxin produced by the New York Health Department was begun, the amounts used and distributed, of both the foreign and domestic products, increasing gradually until the Fall, when a very rapid expansion in the use of antitoxin took place, as indicated by the large increase in its sale, its free distribution to the physicians of the city, and its free administration by the Medical Inspectors of this Department.

"Proceeding now to the consideration of the figures in Table VIII., we note that the percentage of mortality from diphtheria and croup in 1895 (19.1 per cent.) is much lower than for any previous year, even when compared with the percentage of mortality from diphtheria alone. The lowest rate prior to 1895 is that of 1889 (25.9 per cent.), which, for reasons previously given, is certainly too low. It is also to be noted that the decrease in mortality from 1894 to 1895 is considerable, amounting to over 35 per cent. of the rate for 1894. In the sixteen years for which the figures are given, the greatest previous increase or decrease in case fatality for any year, as compared with that preceding it, is in 1887, when the decrease amounted to 25 per cent. of the rate for 1886, or 12 per cent. less than the percentage decrease, 1894 to 1895. But in this year (1887) the decrease in death-rate is accompanied by an increase of 361 in the number of deaths, while in 1895 there is a decrease of 894 in the absolute mortality, as compared with that of 1894. This large actual and relative decrease in case fatality in 1895 points to the introduction in this year of some previously non-existent factor.

"Proceeding next to a comparison of total cases with total deaths, there is indicated an apparent tendency toward correspondence of deaths and cases as to increase or decrease. To this there are several exceptions, as will be seen by an examination of the figures. From 1890 to 1894, however, with the exception of a small decrease in the number of cases in 1892 as compared with the previous year, there is a steady and rapid increase in both cases and deaths until 1895, when this correspondence is abruptly destroyed, a very large decrease in deaths taking place, while the number of cases is increased by 712, making the total of cases for 1895 the largest ever recorded in the city. The introduction of some disturbing factor, previously non-existent, is thus again strongly indicated.

TABLE VIII.

York—Diphtheria and Croup ; Cases and Deaths, with Case Fatality, 1880, *to October,* 1896, *inclusive.*

YEAR.	CASES.			DEATHS.			CASE FATALITY.	
	Diphtheria.	Croup.	Total.	Diphtheria.	Croup.	Total.	Diphtheria.	Diphtheria and Croup.
	3,307	...	....	1,390	910	2,300	42.3	....
	5,196	...	....	2,249	1,038	3,287	43.3	....
	3,507	...	....	1,525	729	2,254	43.5	....
	2,096	...	....	1,009	644	1,653	48.1	....
	2,223	...	....	1,090	748	1,838	49.0	....
	2,920	...	....	1,325	855	2,180	45.4	....
	3,737	...	....	1,727	968	2,695	46.2	....
	5,923	...	....	2,167	889	3,056	36.6	....
	6,491	...	....	1,914	639	2,553	29.5	....
	6,489	...	....	1,686	605	2,291	25.9	....
	4,350	...	....	1,262	521	1,783	29.0	....
	4,874	490	5,364	1,361	609	1,970	27.9	36.7
	4,654	530	5,184	1,436	670	2,106	30.9	40.6
	6,468	553	7,021	1,970	588	2,558	30.4	36.4
	9,155	486	9,641	2,359	511	2,870	25.8	29.7
	9,925	428	10,353	1,634	342	1,976	16.4	19.1
	8,046	240	8,286	1,224	168	1,392	15.2	16.8

irst, second and third quarters only.

'Table IX., with accompanying chart, gives the case fatality from diphtheria and croup for
ls of four weeks, the figures for cases and deaths on which it is based being taken from the
ly reports of the Health Department. Bacteriological examinations in the diagnosis
phtheria were inaugurated by the Department in May, 1893, and by the autumn of that
had been very generally adopted by the medical profession, and entirely so by this
rtment through its medical inspectors, as an efficient adjunct to clinical diagnosis. It has
claimed that a considerable increase in reported cases of mild diphtheria, with a consequent
ase in case fatality, results from the extended use of bacteriological examinations in this
e. This claim is not substantiated by a careful comparison, recently made in this office, of
linical diagnosis with the results of bacteriological examination in cases of suspected diph-
.; but supposing it to be true, any variation in case fatality so produced would in all proba-
have been relatively the same in the period selected for comparison, previous to the intro-
on of antitoxin (*i.e.*, November, 1893, to November, 1894), as in the corresponding
ls after its use had been begun. The influence of this factor may therefore be almost
ly disregarded. Considering the chart, we note, in the year previous to the introduction of
xin, an increase of case fatality from 32.3 per cent. in November to a maximum of 43.3 per
in January, followed by a decrease to a minimum of 27.1 per cent. in July. With the excep-
f a slight decrease in October, 1894, the case fatality increases from July to November.
is point, coincident with the introduction of antitoxin, a decrease begins, continuing steadily,
the exception of a slight rise in January, to March, 1895. This is in sharp contrast with the
s for the corresponding period of the previous year. From March to June, 1895, the rate
ins practically constant, declining to a minimum of 17.2 per cent. in July. The usual seasonal
se in case fatality then begins, but in October, at which period began the rapid extension in
e of antitoxin previously noted, a decrease begins, which, with the exception of compara-
small increases in November, 1895, and March, 1896, and a somewhat marked rise in August,
has continued to date of writing (November 1, 1896). The case fatality for October (12.8
ent.) is the lowest ever recorded for a corresponding period in New York. The rise in
st (from 14.4 per cent. for July to 20.6 per cent.) is undoubtedly due, in large measure, to
rotracted period of extreme heat, which occurred in the early part of this month, and which
ced the highest general mortality recorded in this city for many years. It is interesting to
that the usual seasonal decrease in actual cases and deaths during the late summer and early
nn, followed by an increase on the advent of colder weather, and the opening of the public
ls, occurred both before and after the introduction of antitoxin, being apparently uninfluenced
is, and bearing, as a rule, no direct relation to the changes in case fatality recorded.

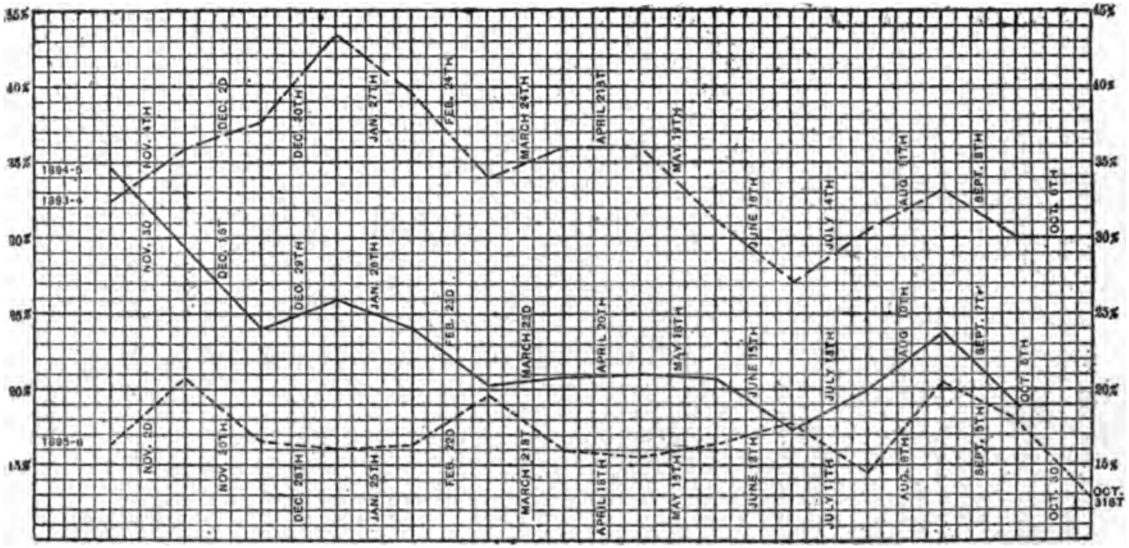
TABLE IX.

NEW YORK—DIPHTHERIA AND CROUP.

Cases and Deaths, with Case Fatality, for Periods of Four Weeks, November, 1893, *to October,* 1896.

4 WEEKS ENDING—	Year.	Cases.	Deaths.	Case Fatality.	4 WEEKS ENDING—	Year.	Cases.	Deaths.	Case Fatality.	4 WEEKS ENDING—	Year.	Cases.	Deaths.	Case Fatality.
Nov. 4...	1893	634	205	32.3	Nov. 3....	1894	454	157	34.5	Nov. 2...	1895	600	100	16.7
Dec. 2...	"	722	259	35.9	Dec. 1....	"	664	196	29.5	Nov. 30...	"	666	140	21.0
Dec. 30...	"	747	272	36.4	Dec. 29....	"	786	190	24.2	Dec. 28...	"	974	159	16.3
Jan. 27...	1894	732	317	43.3	Jan. 26....	1895	803	207	25.8	Jan. 25...	1896	1,133	181	16.0
Feb. 24...	"	700	276	39.4	Feb. 23....	"	700	171	24.4	Feb. 22...	"	1,041	172	16.5
Mar. 24...	"	690	236	34.2	Mar. 23....	"	827	168	20.3	Mar. 21...	"	846	165	19.5
Apr. 21...	"	739	266	36.0	Apr. 20....	"	885	183	20.7	Apr. 18...	"	856	135	15.8
May. 19...	"	837	291	36.0	May 18....	"	886	184	20.8	May 16...	"	1,023	157	15.4
June 16...	"	880	271	30.8	June 15....	"	860	177	20.6	June 13...	"	1,030	167	16.2
July 14...	"	850	230	27.1	July 13....	"	830	143	17.2	July 11...	"	854	150	17.6
Aug. 11...	"	590	180	30.5	Aug. 10....	"	701	139	19.8	Aug. 8...	"	694	100	14.4
Sept. 8...	"	434	144	33.2	Sept. 7....	"	497	118	23.7	Sept. 5...	"	441	91	20.6
Oct. 6...	"	423	126	29.8	Oct. 5....	"	486	92	18.9	Oct. 3...	"	524	94	17.9
										Oct. 31...	"	626	80	12.8

CHART NO. 1. TO ACCOMPANY TABLE IX.



New York—Diphtheria and Croup. Case Fatality, Periods of Four Weeks. November, 1893, to October, 1896.

"Table X., with accompanying chart, gives the case fatality in diphtheria and croup for periods of four weeks in New York and Paris, and for diphtheria only (croup not separately reported) in Berlin. Cases of croup are not separately reported in the statistics of the latter city. The figures for cases and deaths are taken from weekly reports of the three cities, and for New York correspond with those presented in a portion of Chart No. 1. In Paris, antitoxin was in general use in January, 1895, the beginning of the period tabulated, and was largely used in Berlin, while in New York it had just been introduced. The gradual approximation of the case fatality in New York to that in Paris and Berlin is well shown in the chart, and coincides with the increasing use of antitoxin in the former city. In Berlin, climatic influences appear to have but little, if any, effect in increasing or diminishing the number of actual cases and deaths. The effect on case fatality is, however, more apparent, as the lowest rate for 1895 (12.1 per cent.) occurs in July. In Paris the seasonal variations coincide quite closely with those in New York for 1894, the lowest case fatality and smallest number of deaths occurring in July, and the smallest number of cases in October. The remarkably low case fatality in Paris is of special interest. In July, 1895, it reached the extraordinarily low figure of 4.8 per cent., while the highest record-rate (May, 1896,) is but 15.9 per cent.

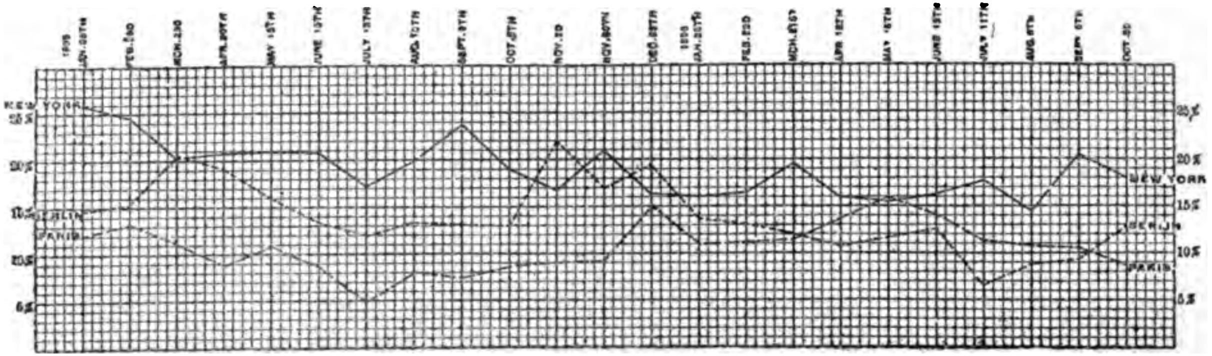
TABLE X.

Cases and Deaths, with Case Fatality, for Periods of 4 *Weeks—January,* 1895, *to October,* 1896.

4 WEEKS ENDING—	YEAR.	NEW YORK.			PARIS.			BERLIN.		
		DIPHTHERIA AND CROUP.			DIPHTHERIA AND CROUP.			*DIPHTHERIA ONLY.		
		Cases.	Deaths.	Case Fatality.	Cases.	Deaths.	Case Fatality.	Cases.	Deaths.	Case Fatality.
January 26	1895	803	207	25.8	355	42	11.8	520	76	14.6
February 23	"	700	171	24.4	350	46	13.1	384	58	15.1
March 23	"	827	168	20.3	375	42	11.2	417	86	20.6
April 20	"	885	183	20.7	362	32	8.8	350	67	19.1
May 18	"	886	184	20.8	338	36	10.7	351	56	16.0
June 15	"	860	177	20.6	280	24	8.6	428	57	13.3
July 13	"	830	143	17.2	294	14	4.8	479	58	12.1
August 10	"	701	139	19.8	314	25	8.0	432	58	13.4
September 7	"	497	118	23.7	243	18	7.5	426	56	13.1
October 5	"	486	92	18.9	221	19	8.6	582	75	12.9
November 2	"	600	100	16.7	290	26	9.0	469	104	22.2
November 30	"	666	140	21.0	419	34	9.1	592	101	17.1
December 28	"	974	159	16.3	484	72	14.9	483	95	19.6
January 25	1896	1,133	181	16.0	404	44	10.9	395	54	13.7
February 22	"	1,041	172	16.5	473	53	11.2	380	50	13.2
March 21	"	846	165	19.5	387	44	11.4	372	44	11.8
April 18	"	856	135	15.8	319	43	13.5	345	37	10.7
May 16	"	1,023	157	15.4	336	53	15.9	294	34	11.6
June 13	"	1,030	167	16.2	281	40	14.0	283	35	12.4
July 11	"	854	150	17.6	276	31	11.2	250	17	6.8
August 8	"	694	100	14.4	253	27	10.7	231	20	8.7
September 5	"	441	91	20.6	210	20	10.5	279	26	9.3
October 3	"	524	94	17.9	173	15	8.7	369	47	12.8

*Cases of Croup are not reported in the Berlin statistics for the City in general.

CHART No. 2. TO ACCOMPANY TABLE X.



New York, Paris—Diphtheria and Croup. Berlin—Diphtheria only. Case Fatality, Periods of Four Weeks. 1895–1896.

"Table XI., with accompanying chart, gives the number of deaths from diphtheria and croup, per 100,000 of population, in Berlin, Paris and New York, from 1886 to 1895. In all three cities the ratio of deaths to population is lower in 1895, and the decrease from the ratio of the preceding year greater than for any previous year, with the exception of Berlin, where the decrease of ratio from 1890 to 1891 is greater than that from 1894 to 1895. In Paris and Berlin the actual number of deaths, independent of the population, is lower than for any previous year—in Paris most markedly so, less than one-half of that of the lowest previous annual mortality (that of 1894), when antitoxin was already in use. In New York the decrease from the ratio of 1894 is in excess of any change in previous years, the decrease being 33 per cent. of the ratio of 1894, as compared with a decrease from 1889 to 1890 of 24 per cent. of the ratio of 1889, the largest previous change.

TABLE XI.

BERLIN, PARIS, NEW YORK—DIPHTHERIA AND CROUP.

Number of Deaths per 100,000 *of Population*, 1886–1895, *Inclusive.*

Year.	BERLIN.				PARIS.				NEW YORK.			
	Deaths.	Population.	Ratio.	Change from ratio of previous year.	Deaths.	Population.	Ratio.	Change from ratio of previous year.	Deaths.	Population.	Ratio.	Change from ratio of previous year.
1886	1,688	1,343,609	125.7		1,661	†2,268,864	73.2		2,695	1,437,170	187.5	
1887	1,404	1,393,586	100.7	—25.0	1,769	2,300,818	76.9	+3.7	3,056	1,479,143	206.6	+19.1
1888	1,100	1,445,422	76.1	—24.6	1,953	2,333,322	83.7	+6.8	2,553	1,522,341	167.7	—38.9
1889	1,284	1,499,187	85.6	+9.5	1,890	2,366,082	79.9	—3.8	2,291	1,566,801	146.2	—21.5
1890	1,586	*1,554,951	102.0	+16.4	1,859	2,399,405	77.5	—2.4	1,783	1,612,559	110.6	—35.6
1891	1,073	1,589,969	67.5	—34.5	1,531	†2,428,989	63.0	—14.5	1,970	1,659,654	118.7	+8.1
1892	1,495	1,609,301	92.9	+25.4	1,557	2,446,229	63.6	+0.6	2,106	1,708,124	123.3	+4.6
1893	1,643	1,628,868	100.8	+7.9	1,266	2,463,529	51.4	—12.2	2,558	1,758,010	145.5	+22.2
1894	1,430	1,648,672	86.7	—14.1	1,009	2,481,066	40.7	—10.7	2,870	1,809,353	158.5	+13.0
1895	996	*1,668,717	59.7	—27.0	‡442	2,498,670	17.7	—23.0	1,976	1,879,195	105.2	—53.3

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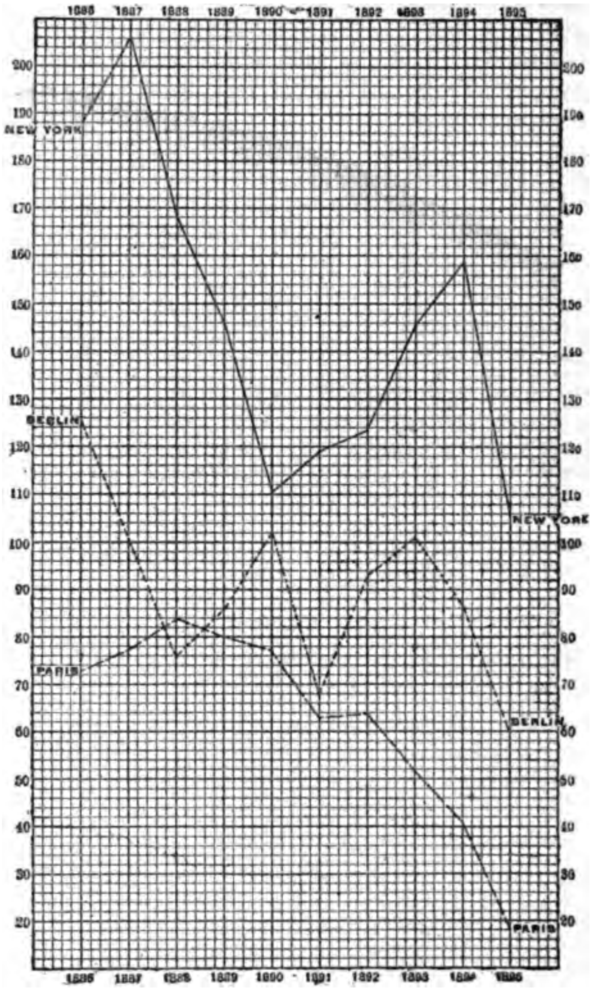
* Census—December 1, 1885, 1,315,387; December 1, 1890, 1,578,794; December 2, 1895, 1,677,135—Populations are calculated by Farr's formula for July 1 of each year, from the censuses of 1885, 1890 and 1895.

† Census—Populations are calculated by Farr's formula for July 1 of each year, from the censuses of 1886, 1891 and March 29, 1896.

‡ Monthly report missing for October. Figures for this month are taken from the weekly reports, September 28 to November 2.

CHART NO. 8. TO ACCOMPANY TABLE XI.



Berlin, Paris, New York—Diphtheria and Croup. Number of Deaths per 100,000 of Population, 1886–1895.

"Tables XII. and XIII. give the deaths from diphtheria and croup in Paris and Berlin, respectively, from January, 1889, to June, 1895, inclusive, by months. The remarkable decrease in mortality in Paris, coincident with the introduction of antitoxin, is well shown, the number of deaths per month falling off rapidly from June, 1894, while the annual mortality for 1895 exhibits a large decrease from previous years, being but 44 per cent. of that in 1894, which is itself lower than that for any previous year, back to 1886, the figures before this date not being at command. In the week ending September 19, 1896, with 85 cases reported during this and the previous week, not a single death occurred from diphtheria or croup in the city of Paris.

TABLE XII.

Paris—Deaths from Diphtheria and Croup, by Months, 1889, to July, 1896.

MONTH.	1889.	1890.	1891.	1892.	1893.	1894.	1895.	1896.
January	214	136	184	120	164	145	48	53
February	185	182	202	135	108	110	47	61
March	219	211	192	162	149	148	45	59
April	174	196	183	131	136	133	36	69
May	184	169	145	153	133	122	38	56
June	148	144	103	124	115	80	14	31[2]
July	128	147	95	108	83	78	25	..
August	125	131	78	115	80	64	23	..
September	135	114	64	99	63	31[1]	20	..
October	116	125	73	106	58	27	33[2]	..
November	125	134	97	134	68	33	38	..
December	137	170	115	170	109	38	73	..
Year	1,890	1,859	1,531	1,557	1,266	1,009	440	..

[1] Antitoxin in general use.

[2] Monthly report missing; estimated from the weekly returns.

	Antitoxin not used.	Antitoxin in general use.
Largest number of deaths for any month	219	73
Smallest number of deaths for any month	58	14

TABLE XIII.

Berlin—Deaths from Diphtheria and Croup, by Months, 1889, to July, 1896.

MONTH.	1889.	1890.	1891.	1892.	1893.	1894.	1895.	1896.
January	119	154	102	119	165	138	79[1]	72
February	109	108	103	103	145	137	64	55
March	98	134	86	113	115	140	88	46
April	94	167	73	94	120	133	68	49
May	75	126	73	93	106	134	56	45
June	82	119	67	81	101	96	74	27
July	70	90	49	88	116	71	77	..
August	91	106	64	90	92	92	57	..
September	113	146	96	100	162	134	88	..
October	119	137	112	140	174	119	120	..
November	131	161	127	182	182	118	115	..
December	183	136	126	193	163	118	110	..
Year	1,284	1,584	1,078	1,406	1,643	1,430	996	294[2]

[1] Antitoxin largely used.

[2] Mortality for first half of 1896.

"Table XIV. gives the case fatality from diphtheria and croup in the Paris hospitals by months, quarters and years, 1893 to 1895, inclusive, with a portion of 1896. Antitoxin was introduced into some of the hospitals some time in advance of its employment in the city at large (it having been used somewhat during June, July and August, 1894, and generally after September). The reduction in case fatality subsequent to its introduction is extraordinary. The lowest rate recorded

1893 is for October (37 per cent.), while in 1894, prior to the introduction of antitoxin, the lowest e is that for February (47 per cent.). As compared with these, the highest rate in 1895 and)6 is that for December, 1895 (19.7 per cent.). The quarterly and yearly statistics are equally king. The lowest rate for 1893 and 1894, before the general use of antitoxin, is that for the rd quarter of 1894 (40 per cent.), at which time antitoxin was already in use to a considerable ent, while the highest subsequent rate is that for the second quarter of 1896 (17 per cent.). For year 1895, the rate reaches the extraordinarily low figure of 13.6 per cent., as compared with 4 per cent. for 1893, 50.3 per cent. for the first three-quarters of 1894, and 35.5 per cent. for year (antitoxin in use during the last quarter of the year).

" Here, as in all other tables presented, the case fatality rapidly decreases with the introduction l increasing use of antitoxin, although in each of the three cities this took place at a time when case fatality is normally on the increase with the advent of cold weather.

TABLE XIV.

'aris Hospitals—Diphtheria and Croup; Cases and Deaths, with Case Fatality, by Months.

MONTH.	1893.			1894.			1895.			1896.		
	Cases.	Deaths.	Case Fatality.	Cases.	Deaths.	Case Fatality.	Cases.	Deaths.	Case Fatality.	Cases.	Deaths.	Case Fatality.
uary	208	126	60.6	210	128	61.0	286	49	17.1	266	37	13.9
ruary	143	54	37.7	202	95	47.0	264	40	15.2	278	44	15.9
·ch	231	119	51.5	232	125	53.9	270	33	12.2	272	36	13.2
il	219	122	55.7	230	117	50.9	264	30	11.4	252	47	18.6
	147	87	59.2	204	106	52.0	212	25	11.8	230	35	15.0
	178	95	53.3	115	34	29.6	143	15	10.5	....	..	....
	120	62	51.7	153	56	36.6	160	18	11.2	....	..	....
ust	108	42	38.9	131	49	37.4	138	22	15.9	....	..	....
tember	111	55	49.5	151	29	19.2	162	15	9.3	....	..	....
ober	108	40	37.0	205	29	14.2	221[1]	26[1]	11.8	....	..	....
ember	111	68	61.3	272	35	12.9	235	29	12.3	....	..	....
ember	198	98	49.5	350	34	9.7	309	61	19.7	....	..	....
Year	1,882	968	51.4	2,355	837	35.5	2,664	363	13.6	....	..	....

[1] Monthly reports not available; figures are taken from the weekly reports.

The Same, by Quarters and Years.

QUARTER.	1893.			1894.			1895.			1896.		
	Cases.	Deaths.	Case Fatality	Cases.	Deaths.	Case Fatality	Cases.	Deaths.	Case Fatality	Cases.	Deaths.	Case Fatality
quarter	582	299	51.4	644	348	54.0	820	122	14.9	816	117	14.3
nd quarter	544	304	55.9	549	257	46.8	619	70	11.2	482[1]	82[1]	17.0
d quarter	339	159	46.9	335	134	40.0	460	55	12.0	...	...	....
th quarter	417	206	49.4	827	98	11.8	765	116	15.3	...	...	....
Year	1,882	968	51.4	2,335	837	35.5	2,664	363	13.6	....	...	....

[1] April and May only.

" Table XV. presents statistics for the Berlin Hospitals similar to those given for Paris in Table They are, unfortunately, incomplete, no figures for 1894 being at command, and for 1893 the ıal figures only. A comparison of the case fatality for 1893 with that for 1895 is, however, rely confirmatory of the figures previously considered. The rate for 1893 is 44 per cent.; that 1895, 15.7 per cent.

TABLE XV.

Berlin Hospitals—Diphtheria and Croup; Cases and Deaths, with Case Fatality, by Quarters and Years.

QUARTER.	1893.			1895.			1896.		
	Cases.	Deaths.	Case Fatality.	Cases.	Deaths.	Case Fatality.	Cases.	Deaths.	Case Fatality.
First quarter				737	141	19.1	628	80	12.7
Second quarter	Mont'ly	figures	for 1893	712	73	10.3	472	71	15.0
Third quarter	are	not rep	orted.	845	125	14.8	....	....	....
Fourth quarter				850	154	18.1	....	....	....
Year	2,570	1,132	44.0	3,144	493	15.7	....	....	....

(The Berlin hospital statistics for 1894 are not available).

NOTE.—The case fatalities for both Berlin and Paris hospitals are calculated on the sum of the total cases, discharged by death or recovery during each month, quarter or year. The number of cases admitted during and remaining in hospital at the end of each month, quarter or year is not given in the statistics.

"Considering as a whole the facts and figures presented above, we observe that a large and rapid decrease in the absolute number of deaths from diphtheria and croup has taken place at certain times in three cities, of varying climatic conditions and different nationalities, in which these diseases are endemic. An extraordinary decrease in the case fatality from these diseases has also occurred, and this fatality has not subsequently risen to any extent in a period of some twenty-two months, and is now, in New York, far lower than at any period in the previous twenty-two years. This decrease did not take place at the same time in each of these cities. It occurred in New York some months later than in Berlin, and in Berlin some months later than in Paris. It has, however, occurred in all three cities at a period of the year when, from the history of former years, an increase in the mortality would be expected. The reduction in mortality has occurred in hospital practice as well as throughout the cities at large. It seems evident that some influence, hitherto inoperative, must have come into action to produce the results outlined above. Upon investigation, it appears that all of the results described have followed closely upon the introduction of diphtheria antitoxin, and have become more marked in close coincidence with its increasing use as a remedy for the treatment of diphtheria. The conclusion seems, therefore, inevitable that we owe to antitoxin the remarkable decrease noted in the mortality from diphtheria and croup in these cities."

The following résumé of the statistics and reports on the antitoxin treatment of diphtheria begins with the first extensive application of the new remedy in the early part of 1894, and brings the subject as nearly as possible up to date (October 1, 1896).

In reviewing the reports which have been published in the various medical journals of the Continent of Europe, Great Britain and the United States, such a mass of material has been found that it has been no easy matter to sift and condense it in such a way as to make it available for the purpose desired.

Several collective investigations of the antitoxin treatment of diphtheria have already been published in Germany and this country by Heubner, Monti, Eulenberg, Crandall, Forster, Welch, The Kaiserliches Gesundheitsamt in Berlin and others; and though in making these investigations the whole field has been carefully gone over, there has been no hesitation in following the paths which others have marked out. Special acknowledgment of obligation for assistance, however, is due to Welch's most admirable article on this subject.

It is hoped that such a compilation of the results obtained by a large number of the best scientific and clinical observers in all parts of the world, from a thorough trial of antitoxin for a period extending over two years, may be of use and interest, not only in demonstrating the value of the remedy, but also in inducing a still more extended application of what may now be confidently affirmed to be a specific against one of the most terrible diseases with which we have to deal.

The first report of experiments made with the blood serum of immunized animals was communicated by Behring and Wernicke to the Seventh International Congress of Hygiene and Demography, held in London, August, 1891. In 1892 these authors published a second article describing more fully the principles of serum-therapy as applied to diphtheria. The earliest report of cases treated with antitoxin was in 1893, and consisted of thirty cases of diphtheria treated by Behring in the Institute for Infectious Diseases in Berlin. At this time the serum employed was very weak in antitoxin, but later Behring and Ehrlich succeeded in obtaining a stronger serum (though for some time the serum did not have the strength which is now considered to be necessary for curative purposes). In April, 1894, 233 cases of diptheria treated in the Berlin hospitals, with a mortality of 23 per cent., were reported by Ehrlich, Kossel and Wassermann. Dr. Otto Katz reported to the Berlin Medical Society on June 27, 1894, the results of the antitoxin treatment of 128 cases from March 14, 1894, in Professor Baginsky's service, in the "Kaiser und Kaiserin Friedrich Kinder-Krankenhaus," in Berlin. The serum used in these cases was Aronson's serum obtained from horses. A few weeks later Baginsky reported 163 cases in all, with a mortality of 12.9 per cent. Several reports now appeared of similar results obtained during the latter part of 1893 and the first part of 1894.

It remained, however, for Roux to arouse the interest of the world in the discovery which Behring had announced three years before. His masterly address delivered at the Eighth International Congress of Hygiene and Demography, held in Budapesth, September, 1894, in which he gave a clear and forcible description of his experiments and results in the treatment of 300 cases of diphtheria with antitoxin, in the hospital Des Enfants Malades in Paris, really directed the attention of the whole medical profession to this subject, and with this may be said to have begun the first extensive application of the new treatment for diphtheria.

In reviewing the subject of the antitoxin treatment of diphtheria, it will be found that its value has been tested chiefly in two ways: The first is by a study of statistics, which show the absolute mortality in cities and hospitals before and since the introduction of antitoxin, and the comparative mortality of series of cases treated by antitoxin with that of similar series treated previously, or simultaneously, in other ways; the other is by the clinical method, the observation of the effect of antitoxin upon the course of the disease.

All statistics are open to fallacies, owing to varying factors and conditions. The age of the patient is a most important factor in determining the mortality in diphtheria, either with or without the use of antitoxin, and unless the age is stated the statistics are of little value.

Different methods of diagnosis may also lead to errors in the conclusions. The diagnosis of the cases treated by antitoxin has been usually verified by bacteriological examination, whereas in former times the diagnosis was mostly clinical. A bacteriological examination enables us now to exclude from our statistics many cases of angina which would formerly have been included. These cases are less severe than cases of true diphtheria, and on this account the statistics of mortality in the older reports are lower than they should be. On the other hand, a bacteriological examination often enables us to recognize as diphtheria mild cases of angina, which in former days would not have been included in diphtheria statistics. It is not likely, however, that among hospital patients the number in this class is as large as in the other. Experience, moreover, has shown that the cases which, on bacteriological examination, have proved to be true diphtheria, when subjected to the former methods of treatment, have given the highest mortality.

Another question to be considered is the severity of the epidemic. This not infrequently varies in different times and places. The only way to avoid the fallacy thus arising is to take a large number of cases for comparison occurring in widely separated places and over an extended period of time, and to compare cases treated with and without antitoxin at the same time and in the same place.

Again, it is maintained by some that the low rate of mortality in diphtheria, which has been ascribed by its advocates to the antitoxin treatment, is due to a large increase in the number of cases, a milder type of the disease being now received into the hospitals, owing to the early treatment recommended under the new method, while formerly only the severest cases were brought for treatment. This is possibly true to a certain extent in some hospitals, but it does not account for the great difference in the total mortality between the old and the new treatment; then, too, many cases are now excluded, as all cases admitted into the hospitals are bacteriologically diagnosed and treated only with antitoxin when found to be true diphtheria, and the remaining cases, if not brought for early treatment, would frequently have developed into severe or fatal cases.

Regarding the value of the evidence as to the efficacy of the remedy based on clinical study, this, of course, depends upon the confidence we place in the opinions formed by the individual observers. But when the opinions, expressed by many of the best clinical observers in Germany, Austria, France, England and America, etc., are almost unanimously in favor of it; and when we consider that the majority of these men, if not absolutely opposed to the new treatment, were very timid and cautious in adopting it, and have reached their conclusions only after the most convincing proofs based on practical results, it would seem that there were no longer any reasonable grounds for refusing to accept the opinion of the vast majority.

It remains now to present a series of statistical tables showing the results of the antitoxin treatment up to the present time. The statistics contain all the larger series of cases which have been reported up to date (omitting the statistics of the New York Board of Health, which are given separately), which it has been possible to find in the library of the Academy of Medicine. The list is not complete, as no single or isolated cases have been taken, only series of cases of 10 and over. There has been no selection of cases, and no reduplication, so far as known; certainly none that could be avoided.

The results obtained by different observers naturally vary somewhat, taken as they are from so many different sources treated under such varying conditions, and with such different preparations of antitoxin, and yet, on the whole, the apparent unanimity is all the more remarkable on this very account, and proves that the total results arrived at are reasonably true and conclusive. Admitting all possible accidental errors which may have arisen—and it is simply preposterous to assume that intentional errors have been committed by scientific observers in every part of the world—the fact remains that in over 24,000 cases of diphtheria treated with antitoxin, which have been reported, the mortality has been apparently reduced by fully 50 per cent.

Summaries of the various tables, prepared from the collected reports, follow. The complete tables will be found at the end of the report.

TABLE XVI.

Mortality of Cases of Diphtheria Treated with Antitoxin, and Previous or Simultaneous Percentage of Mortality without Antitoxin.

This table gives the number of cases treated with antitoxin, the number and percentage of deaths, and the previous or simultaneous percentage of mortality without antitoxin, contained in 158 reports of larger series of cases, in hospital and private practice. These cases include not only those which, in the early use of antitoxin, were given insufficient doses, but also the cases which were moribund at the time of the first injection, or died within twenty-four hours after it.

In a total of 24,768 cases treated with antitoxin, there were 4,004 deaths, or an average mortality of 16 per cent. The following is a summary of the results obtained in hospital and private practice:

SUMMARY OF TABLE XVI.

	CASES	DEATHS	MORTALITY, PER CENT.	PREVIOUS MORTALITY, PER CENT.
In 109 reports from hospital practice	15,560	3,009	19.0	30 to 40
In 49 reports from private practice	9,208	995	10.1	
Total in 158 reports	24,768	4,004	16.0	30 to 40

In 109 reports from hospitals there were 15,560 cases, with 3,009 deaths, or a mortality of 19 per cent., with the antitoxin treatment; in 49 reports from private practice there were 9,208 cases, with 995 deaths, or a mortality of 10.1 per cent., or in a total of 24,768 cases there were 4,004 deaths, a mortality of 16 per cent., as against a previous or simultaneous mortality of 30 to 40 per cent. (taking the lowest figures in the reports) without antitoxin.

It would appear, therefore, according to these reports, that there has been a reduction of mortality in diphtheria, in both hospital and private practice, of at least 50 per cent., as the result of the antitoxin treatment. The lower percentage of mortality in private practice is probably due to the fact that the patients usually come under treatment in an earlier stage of the disease, and are generally more favorable cases.

TABLE XVII.

Mortality of Cases of Diphtheria Treated with and without Antitoxin.

This table gives the number of cases (taking the reports which show these data) treated *with* and *without* antitoxin, and the percentage of mortality. These cases were treated simultaneously or during intervals of forced interruption of the antitoxin treatment, or in the periods immediately before and after the antitoxin treatment:

SUMMARY OF TABLE XVII.

	CASES.	DEATHS.	MORTALITY. PER CENT.
Hospital cases with antitoxin	7,986	1,754	21.0
Hospital cases without antitoxin	9,039	3,309	36.4
Private cases with antitoxin	3,161	412	13.0
Private cases without antitoxin	4,255	1,717	40.0
Total in 45 reports, with antitoxin	11,147	2,169	19.1
Total in 45 reports, without antitoxin	13,294	5,026	37.8

From 45 reports in which these cases were recorded, it appears that there were 11,147 cases treated with antitoxin, resulting in 2,169 deaths, or a mortality of 19.1 per cent.; while at the same time, or during the period immediately before or after the antitoxin treatment, there were 13,294 cases treated without antitoxin, with 5,026 deaths, or a mortality of 37.8 per cent.

Separating the hospital and private cases, there were treated in hospital 7,986 cases with antitoxin, with a mortality of 21 per cent., as against 9,039 cases treated without antitoxin, with a mortality of 36.4 per cent. In private practice there were 3,161 cases treated with antitoxin, resulting in a mortality of 13 per cent., as against 4,255 cases treated without antitoxin, with a mortality of 40 per cent.

Thus put to the severest test, selecting only the worst cases, as was often done intentionally for the purposes of control, and to determine the value of the new remedy (though occasionally it was an unfortunate necessity, owing to the lack of antitoxin, as some reports show, which compelled a forced interruption of the antitoxin treatment), there is still a difference of 50 per cent. in favor of the antitoxin treatment. Surely no effect of climate, or season, or "genius epidemicus," or any of the various theories brought forward by the opponents of antitoxin, can explain the difference in these results. Some other and more powerful factor than any or all of these was evidently at work to produce such a striking contrast in the practical results from two modes of treatment applied at the same time, or under identically the same conditions, by so many different observers.

Some of the details of the most striking of these groups of cases which were treated with and without antitoxin at the same time, or during intervals of forced interruption, may be tabulated as follows:

TABLE XVIIA.

	WITH ANTITOXIN.			WITHOUT ANTITOXIN.		
	Cases.	Deaths.	Per Cent.	Cases.	Deaths.	Per Cent.
1. Hospital d. Enfants Malades, Paris	300	78	26.0	....	....	....
2. Hospital Trousseau, Paris	....	....	....	520	316	60.0
3. Hospital Franz Josef	110	14	12.7	144	62	43.0
4. Unterholzner	37	8	25.8	36	24	66.0
5. Epidemic, Triest	321	56	17.1	427	213	50.0
6. Kaiser and Kaiserin Friedrich Hospital, Baginsky	303	39	13.2	230	70	47.8
7. Vucetig	30	2	6.6	30	6	20.0
8. Austrian statistics	1,128	149	13.2	1,849	704	38.1
9. Rauchfuss (Russia)	34	7	21.0	30	16	52.0
10. v. Engel	39	10	25.5	62	31	50.0
11. Charité Hospital, Berlin	299	53	16.7	....	....	....
12. Bethany Hospital, Berlin	....	....	....	249	12	43.1
13. Blumenfeld	229	20	8.7	48	11	23.6
Totals	2,930	436	14.9	3,625	1,455	40.0

In a total of 2,930 cases treated with antitoxin, 436 died, giving a mortality of 14.9 per cent., while of 3,625 cases treated without antitoxin at the same time, or during intervals of forced interruption (owing to lack of antitoxin), 1,455 died, a mortality of 40 per cent.

Explanatory Notes Regarding the Statistics in Table XVIIa.

Roux reports 300 cases treated with antitoxin in the Hospital des Enfants Malades (1) in Paris, with a mortality of 26 per cent., at the same time that 520 cases were treated without antitoxin in the Hospital Trousseau (2) with a mortality of 60 per cent. The previous mortality in these hospitals had been about the same; the time, the type of the disease, every condition was the same, except the mode of treatment, and the resulting mortality.

Ganghofner reports 110 cases treated with antitoxin in the Franz Josef Clinic (3) in Prague, with a mortality of 12.7 per cent., while during an interval of forced interruption in the same hospital, owing to the supply of antitoxin having run out, 144 cases were treated without antitoxin, with a mortality of 43 per cent.

Unterholzner (4) in the Leopoldstadt Hospital in Vienna records the results in 37 cases with antitoxin in which the mortality was 25.8 per cent., and 36 cases without antitoxin treatment, in which the mortality was 66 per cent.

During an epidemic of malignant diphtheria in the districts of Triest (5) and Bukowina, the Austrian Health Department sent out a supply of antitoxin to be used among the people. Before the antitoxin arrived the mortality had been fearful in these districts. 321 cases were treated with antitoxin with a mortality of 17 per cent. The supply of antitoxin sent was insufficient to furnish the whole section in which the epidemic was raging. 427 cases were treated without antitoxin, and the mortality among these was 50 per cent.

Baginsky (6) records a most striking illustration of the effects of antitoxin in the Kaiser und Kaiserin Friedrich Kinder-Krankenhaus in Berlin—a result so striking that it converted Professor Virchow, who, up to that time, had been an opponent of the new treatment. In eight weeks in this hospital 63 cases had been treated with antitoxin with a mortality of less than 13 per cent. Suddenly the supply of serum gave out, as unfortunately the horse from which the serum had been taken died. The old methods were resorted to, and, during the next seven weeks, 109 cases were treated without antitoxin with 55 deaths, or a mortality of over 50 per cent. This increase in the mortality induced the hospital authorities to return to the use of the serum. Immediately there was a change. In the next six weeks 84 cases were treated, with a mortality of less than 15 per cent. The total figures are given in the table.

In speaking of this remarkable experience, Professor Virchow said: "All theoretical considerations must give way to the brute force of these figures, and I consider it the duty of every physician to use a remedy giving such clinical results."

Baginsky, in commenting on this circumstance, says: "It is all the more remarkable, as the ratio of mortality of those treated with the serum, before and after the period of interruption, varied within very small limits. If one will permit figures to speak at all, there has scarcely been made on human beings a more demonstrative test of the curative power of a therapeutic agent. It was an experiment forced upon us, but it proved to us how terrible was the form of disease which we were treating, and how numerous would have been the victims without the use of the healing serum."

Professor Virchow again reiterated his opinion in a report, which was read on the antitoxin treatment of diphtheria in the same hospital on December 25, 1895, when he said, that from April to November of that year 303 cases out of 335 treated had recovered, the mortality which had formerly been 43 per cent. having decreased to 9½ per cent.

Vucetig (7) reports two groups of cases of 30 each, one treated with antitoxin and the other with Loeffler's solution; the antitoxin cases gave a mortality of 6.6 per cent., the others a mortality of 20 per cent.

According to the official records of the Austrian Health Department (8), there were treated during the month of February (1896), in all Austria, 1,128 cases with antitoxin, with a mortality of 13.2 per cent., whereas 1,894 cases which were treated without antitoxin at the same time gave a mortality of 38 per cent.

Rauchfuss (9) reports 34 cases treated in hospital, in Russia, with a mortality of 21 per cent., and 30 control cases treated at the same time without antitoxin, with a mortality of 52 per cent.

Von Engel (10) in Bohemia reports 39 cases treated with antitoxin, with a mortality of 25.5 per cent., and 62 cases treated at the same time without antitoxin, with a mortality of 50 per cent. The antitoxin cases in these reports are said to have been unusually severe and therefore taken as a test of the new remedy.

Heubner (11) reports 299 cases treated with antitoxin in the Hospital Charité, in Berlin, with a mortality of 16.7 per cent., and 249 cases treated in the Bethany Hospital (12) at the same time, under the same conditions of age, season, etc., without antitoxin, with a mortality of 43 per cent.

Blumenfeld (13) reports 229 cases treated in private practice with antitoxin, with a mortality of 8.7 per cent., and 48 cases not treated with antitoxin, because they were considered to be too mild; the mortality among the "mild cases" was 23.6 per cent., as against 8.7 per cent. among the apparently severe cases treated with antitoxin.

Many examples of the same kind might be cited from the published reports, but from the above it may be seen that the antitoxin treatment has stood the test of comparison with other approved methods of treatment, whenever the contrast has been decidedly drawn.

Kossel's Statistics of Reduction in the Absolute Mortality from Diphtheria and Croup.

It has been maintained by some, in criticizing the statistics of the antitoxin treatment, that the reduction of the death-rate, as shown by the mortality percentage, proves nothing, if at the same time there has been an increase in the number of cases reported, as the reduced mortality rate may have been due to the milder character of the cases treated; and that the only convincing figures are those which show, not a reduction of percentage mortality, but of absolute mortality.

Kossel has undertaken to satisfy this desideratum in the following statistics:

1. In the Hospital Charité, in Berlin, there were admitted during the years 1886 to 1893-94, an annual average of 146 diphtheria patients, of whom 78, on the average, died; in 1894-95 and 1895-96, 285 were admitted, of whom 40 died. The absolute mortality, therefore, during the serum period (1894-95 and 1895-96) was reduced to one-half of the average for the previous 8 years, though the number of cases admitted had increased twofold.

2. There were reported in all the Berlin hospitals the following cases and deaths from diphtheria during the 11 years, 1885-1896:

YEAR.	CASES.	DEATHS.	YEAR.	CASES.	DEATHS.
1885	1,928	789	1891	1,764	623
1886	1,738	609	1892	2,074	837
1887	1,636	589	1893	2,450	951
1888	1,446	523	1894	2,890	801
1889	1,623	573	1895	3,061	484
1890	1,792	695			

It appears from these statistics that in the Berlin hospitals, as a whole, the deaths have been reduced one-half since the introduction of antitoxin, though the number of cases reported has steadily increased. The statistics for 1896 show still larger reduction in the absolute and case mortality.

3. The following table gives the cases and deaths reported in Berlin and the deaths in Paris (cases not reported previous to 1894) from 1886 to 1896:

YEAR.	BERLIN.		PARIS.	YEAR.	BERLIN.		PARIS.
	Cases.	Deaths.	Deaths.		Cases.	Deaths.	Deaths.
1886	6,968	1,662	1,524	1891	3,504	1,342	1,363
1887	5,438	1,392	1,564	1892	3,683	1,637	1,398
1888	4,190	1,195	1,718	1893	4,315	1,416	1,262
1889	4,220	1,210	1,706	1894	5,220	1,321	993
1890	4,586	1,601	1,639	1895	6,106	987	411

According to these figures the mortality from diphtheria rose and fell in Berlin, corresponding more or less closely to the number of cases reported up to the year 1894. In 1894 and 1895 the cases increase in number, while the absolute mortality declines, and in Paris, in 1895, it decreases to less than one-third of the previous average. The statistics for Berlin for 1896 (see previous table) show an equal reduction. Antitoxin was more slowly introduced there than in Paris.

4. The absolute mortality and deaths per 100,000 population in all German cities of over 15,000 inhabitants, from 1886 to 1895:

YEAR.	ABSOLUTE MORTALITY.	DEATHS PER 100,000.	YEAR.	ABSOLUTE MORTALITY	DEATHS PER 100,000.
1886	12,211	124	1891	10,484	84
1887	10,970	107	1892	12,365	97
1888	10,142	96	1893	16,557	130
1889	11,919	108	1894	13,790	101
1890	11,915	105	1895	7,611	53

Average from 1886 to 1894, 106.

This table shows a steady rise in absolute mortality up to 1894, when there was a moderate reduction, followed by a very great reduction in 1895, when antitoxin was generally used in the German cities. The sudden fall in the absolute mortality from diphtheria amounts to one-half the average of the previous nine years.

Monod, the Director of the Public Health Department of France, has given the average absolute mortality from diphtheria per month for the first six months of each year, from 1888 to 1895, and for 1895, in all French cities of over 20,000 population:

MONTH.	1888-1895	1895.	MONTH.	1888-1895	1895.
January	469	205	May	417	113
February	466	187	June	334	84
March	499	155			
April	442	160	Totals.	2,627	904

The Pasteur Institute in Paris began the distribution of antitoxin in November, 1894. Early in 1895 arrangements were made to furnish antitoxin free to those who were unable to pay for it. In 108 cities of over 20,000 inhabitants, with an aggregate population of 8,150,000, the average number of deaths from diphtheria during the first six months of the seven years, 1888–1895, was 2,627. In the first six months of 1895 the absolute mortality from diphtheria in the same 108 cities was only 904, or a diminution at the rate of 65.6 per cent. The rate of diminution, month by month, went on almost uniformly from one of 56.2 for the month of January to 75 per cent. for the month of June.

From statistics taken from the official records of Berlin, Paris and New York, on file in the office of the New York Health Department, the following death-rates from diphtheria and croup, estimated per 100,000 population, are given :

Absolute Death-Rate per 100,000 *Population.*

YEAR.	BERLIN.	PARIS.	NEW YORK.	YEAR.	BERLIN.	PARIS.	NEW YORK.
1886	125.7	73.2	187.5	1892	92.9	63.6	123.3
1887	100.7	76.9	206.6	1893	100.8	51.4	145.5
1888	76.1	83.7	167.7	1894	86.7	40.7	158.5
1889	85.6	79.9	146.2	1895	59.7	17.7	105.2
1890	102.0	77.5	110.6	1896	30.9	17.5	91.3
1891	67.5	63.0	118.7				

The use of antitoxin began in Paris and Berlin in the latter part of 1894, and was general in 1895 ; in New York antitoxin was introduced by the Health Department in 1895, and is only now becoming generally used.

Aggregate population, deaths and ratio per 100,000 from diphtheria and croup in cities over 100,000 inhabitants, for the years 1894, 1895 and 1896, in Great Britain, France, Belgium, Holland, Germany, Austria, Switzerland, Denmark and Sweden, Russia, Italy and Egypt, compiled from the official records on file in the Registrar's office of the New York Health Department :

	1894.			1895.			1896.[1]		
	Population.	Deaths.	Ratio.	Population.	Deaths.	Ratio.	Population.	Deaths.	Ratio.
Great Britain	9,721,631	4,150	42.7	9,843,854	3,603	36.6	10,077,760	3,854	36.0
France	3,655,203	1,562	42.4	3,655,203	782	21.3	3,655,203	685	18.7
Belgium	1,058,535	378	35.7	1,081,199	215	19.8	1,081,199	154	14.2
Holland	849,264	264	31.0	903,990	152	16.8	903,990	252	27.2
Germany	6,237,751	5,680	91.5	6,403,159	3,362	52.5	6,387,080	2,301	36.0
Austria	2,633,692	2,750	104.4	2,684,377	1,327	51.7	2,736,046	1,186	43.3
Switzerland	103,271	85	82.3	126,497	24	18.9	126,497	18	14.2
Denmark and Sweden	755,078	672	89.0	760,606	218	28.6	760,606	209	27.4
Russia	2,533,300	2,721	108.0	2,548,023	1,692	66.4	2,576,523	1,729	66.7
Italy	1,086,244	373	34.3	1,120,948	221	19.7	1,120,948	216	19.2
Egypt	534,891	97	18.1	534,891	152	28.4	534,891	96	18.0
Totals	29,168,860	18,732	64.2	29,662,747	11,748	39.6	29,960,743	10,700	35.7

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[1] The deaths for the year 1896 are taken from the weekly reports of the first 39 weeks, and from these the average for the 52 weeks has been estimated. For 1894 and 1895 the annual reports are given.

From an examination of these statistics, it appears that the most marked reduction in the death-rate from diphtheria and croup, in the period from 1894 to 1895 and 1896, has occurred in France and Germany, and in those countries, which are more directly under their influence, viz., Austria, Belgium, Switzerland, Denmark and Sweden. This is exactly what we would have expected to find, if the mortality reduction be the result of the antitoxin treatment. There has also been a considerable, but less conspicuous, fall in the death-rates in Russia and Italy. In Great Britain, Holland and Egypt the mortality has been but little affected. But in none of the great cities of the civilized world has there been an increase in the death-rate from diphtheria since the introduction of antitoxin, and in all the countries where antitoxin has been most and longest used the mortality has been distinctly reduced. The reduction, which began in the latter part of 1894, is conspicuous in 1895, and is continued into 1896 with apparently a still further reduction of mortality.

Taking all these figures together, it would seem to have been conclusively proved that, whether we estimate the percentage mortality, or whether we consider the absolute death-rates reported in hospitals or cities as a whole, there has been a marked and sudden reduction in mortality from diphtheria since the introduction of antitoxin. To what else should this be attributed if not to the effects of the antitoxin treatment? It would be a strange coincidence, indeed, which produced by natural causes such a diminution in the death-rate of a disease that had continued unchanged, within slight variation, for many successive years, and then dropped to one-half during the period corresponding to the use of antitoxin, if it were not due to the improved method of treatment.

TABLE XVIII.

Collective Investigations of Other Observers of the Same or Similar Cases Treated with Antitoxin and Previously without Antitoxin.

This table has been prepared in order to compare the results noted in the present report, with the collective investigations of other observers. It gives the total results reported of the antitoxin treatment, and the previous mortality without antitoxin, in twelve collective investigations, published in Germany, Austria, Japan and the United States. It is seen, by a comparison of these reports, that each and all of them record almost exactly the same results, namely, that the mortality from diphtheria has apparently been reduced.

REPORTER.	TREATED WITH ANTITOXIN.			TREATED PREVIOUSLY OR WITHOUT ANTITOXIN: MORTALITY, PER CENT.
	Cases.	Deaths.	Mortality, per cent.	
Heubner, Berlin	3,036	625	20.6	38 to 40
Monti, Vienna	3,888	716	18.4	......
Crandall, St. Louis	2,632	442	16.8	42.0
Forster, Washington	2,740	509	18.5	45.3
Eulenberg and Schwalbe, Berlin	5,833	559	9.6	14.7
Welch, Baltimore	7,166	1,239	17.3	42.0
Kaiserl. Gesundh. Amt. (Berlin):				
First quarter, 1895	2,228	386	17.3	......
Second quarter, 1895	2,130	306	14.3	26.7
Hilbert, Königsberg	7,663	1,282	16.6	38 to 40
Paltauf, Vienna	1,207	138	11.3	38 to 40
Loddo, Japan	10,000	1,800	18.0	44.0
American Ped. Society	5,794	713	12.3	......
Totals	54,317	8,715	16.1	30 to 40
Present report to October, 1896	24,768	4,404	16.0	30 to 40

It would thus appear from this table that twelve different observers, analyzing the same or similar cases treated with antitoxin, have arrived at identically the same result; namely, that the mortality of diphtheria, according to the published reports, has been reduced at least one-half, as the effect of the antitoxin treatment; the average mortality for the antitoxin cases being 16 per cent., including hospital and private practice, and 30 to 40 per cent. for the cases treated previously or without antitoxin. There is naturally in this table, in many instances, a reduplication of cases; they are put together merely to show the uniformity of the results of the collective investigations.

TABLE XIX.

Mortality of Operative and Non-Operative Cases of Diphtheria Treated with Antitoxin.

One of the most significant effects of the antitoxin treatment of diphtheria, and that which affords the best proof of its value, is shown in the remarkable results, which have been obtained in cases of laryngeal diphtheria with stenosis, which include the severest and most fatal forms of the disease.

This table gives the cases, deaths and percentages of mortality in operative and non-operative cases of diphtheria treated with antitoxin, as compared with the previous or simultaneous mortality in operative cases without antitoxin.

SUMMARY OF TABLE XIX.

	TOTAL CASES TREATED.			NON-OPERATIVE CASES.			OPERATIVE CASES.			Previous Mortality, per cent.
	Cases.	Deaths.	Mortality, per cent.	Cases.	Deaths.	Mortality, per cent.	Cases.	Deaths.	Mortality, per cent.	
Total in 72 reports	15,148	2,626	16.6	12,066	1,491	13.5	3,082	1,135	36.7	70.0

Of the 3,082 operative cases, 1,355 were tracheotomized, resulting in 569 deaths, or a mortality of 42 per cent.; 1,173 cases were intubated with 361 deaths, or a mortality of 30.8 per cent.; 52 cases intubated required secondary tracheotomy, of which 37 died, or 71 per cent.; 502 cases required tracheotomy or intubation (it was not stated which), with 168 deaths, or a mortality of 33.2 per cent.

According to a report of 12,736 cases up to 1887, published by Monti, the mortality in tracheotomy previously was 73.3 per cent. Hirsch gives from statistics collected in von Bergmann's clinic the average previous mortality in tracheotomy cases for the last ten years up to July, 1894, at 68.5 per cent. Of 5,546 intubation cases collected by McNaughton and Maddern[1] (1892) the previous mortality was 69.5 per cent. Brown has shown since somewhat better results in intubation, namely, a mortality of 51.6 per cent.

In a total of 15,148 cases treated with antitoxin in this table taken from 72 reports, there were 2,626 deaths, or a mortality of 16.6 per cent.; of these 12,066 cases were not operated on (80 per cent.), of which 1,491 died, giving a mortality of 13.5 per cent.; 3,082 were operated on, intubation or tracheotomy, of which 1,135 died, or 36.7 per cent. Before the antitoxin treatment, 40 per cent. of all cases are reported generally as having required operation, and the previous mortality was 70 per cent. for all operated cases, according to the average figures recorded in these reports.

But taking the lowest average recorded at all in any reports, namely, 68.5 per cent., as the previous mortality in tracheotomy cases, and 51.6 per cent. as the previous mortality in intubated cases, the contrast between these figures and those obtained under the antitoxin treatment is sufficiently evident. Here again, in operative cases of the severest forms of the disease, the mortality seems to have been reduced by nearly fifty per cent., as the result of the antitoxin treatment; while at the same time the number of cases requiring operative interference has decreased to one-half. This last effect of the serum treatment is due to the fact that many cases of beginning laryngeal stenosis are relieved after injection, without having recourse to operation, few or no cases, which were free of laryngeal obstruction when the antitoxin was injected, being reported as having developed such symptoms later.

TABLE XX.

Mortality of Cases Treated with Antitoxin, Arranged According to Age.

As age is an important factor in estimating the value of any treatment of diphtheria, these statistics have been collected from all the reports in which the age was mentioned, and arranged in the form of a table. The reports of age mortality, however, have not been uniformly or systematically recorded; but the main features of the table may be summarized as follows:

SUMMARY OF TABLE XX.

AGE.	CASES.	DEATHS.	MORTALITY, PER CENT.	AGE.	CASES.	DEATHS.	MORTALITY, PER CENT.
0–2 years	1,494	469	31.4	5–10 years	3,184	473	14.8
2–5 years	3,678	762	20.7	Over 10 years	1,444	99	6.9

Comparing these results with those obtained previously or without antitoxin, the following have been reported:

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[1] Collective Investigation of the American Ped. Soc., July, 1896.

HERZ.		HIRSCH.		BAGINSKY.	
Mortality, per cent.		Mortality, per cent.		Mortality, per cent.	
0–1 year	80.0	0–1 year	88.3	0–2 years	63.3
1–3 years	45.0	1–3 years	82.5	2–4 years	52.8
3–5 years	40.0	3–4 years	63.9	4–6 years	37.9
5–10 years	17.0	4–5 years	46.9	6–10 years	24.6
Over 10 years	17.0	6–7 years	43.2	10–15 years	14.6
		Over 7 years	22.2		

The contrast here shown of the results of treatment with or without antitoxin, arranged according to age, is sufficiently evident, and needs no further comment.

TABLE XXI.

Mortality of Cases Treated with Antitoxin Arranged According to the Day of Disease on which Treatment was Commenced.

Behring claims that the specific curative effect of antitoxin will be the more certainly produced the sooner the treatment is commenced; and that out of 100 cases of *true diphtheria*, which are injected with a curative dose of antitoxin within forty-eight hours from the beginning of the disease, not more than five will die.

SUMMARY OF TABLE XXI.

FIRST AND SECOND DAY OF DISEASE.			THIRD AND FOURTH DAY OF DISEASE.			AFTER THE FOURTH DAY.			DAY UNKNOWN.		
Cases.	Deaths.	Mortality, per cent.	Cases.	Deaths.	Mortality per cent.	Cases.	Deaths.	Mortality, per cent.	Cases.	Deaths.	Mortality, per cent.
4,232	267	6.3	3,870	656	17.2	1,984	685	34.6	339	44	13.0

In order to test the truth of this statement, and to determine what has actually been effected by the use of the remedy, this table has been prepared, which gives the mortality of cases treated with antitoxin, arranged according to the day of the disease on which the treatment was begun. It is to be understood, as stated in all the reports, that these statistics are based in most cases upon the statements of parents or friends of the patients, and may not be absolutely correct as to the exact day of the disease on which the antitoxin was administered, but they give, nevertheless, an average of the results obtained.

Taking only those reports in which the day of disease on which treatment was commenced is more specifically stated, we have:

	CASES.	DEATHS.	MORTALITY, PER CENT.
First day of disease	1,415	51	3.5
Second day of disease	2,640	213	8.0
Third day of disease	2,340	300	12.8
Fourth day of disease	1,458	346	23.6
Fifth day and after	1,912	671	35.0
Totals	9,765	1,581	16.1

According to these statistics it is apparent that by far the best results are obtained when treatment is commenced early in the disease, if possible within the first forty-eight hours, and not later than the third day; that after the third day the mortality increases rapidly, and that after the fifth day much less benefit is derived from the use of antitoxin, though it should always be administered.

Considering the fact that in all these statistics are included the cases which were moribund at the time of the first injection, or which died within twenty-four hours after, there would seem to be very good reason to believe, with Behring, Kossel, Roux and other observers, that every fresh case of true pharyngeal diphtheria can be cured by the timely administration of an adequate dose of antitoxin, and that the claim that only five per cent. of the cases injected within the first forty-eight hours of the disease would die, has actually been substantiated.

TABLE XXII.

Immunization by Antitoxin.

The question of immunization now comes up for consideration, and though but comparatively few complete statistics on this subject have been published, yet the prophylactive treatment of diphtheria is a matter of so great importance, that this table has been prepared to show in how far (according to the reports already published) the administration of immunizing doses of antitoxin has resulted in protecting those exposed to infection. The data are incomplete and unsatisfactory, not only from the fact that many cases immunized have not been reported, but also because many reported as immunized have received insufficient doses of antitoxin ; but such as they are the results are interesting as showing the complete protection apparently afforded to many persons exposed to the disease.

According to thirty-five published reports, of which this is a summary, there are 17,516 persons, children and adults, to whom immunizing injections of antitoxin have been given, with the result that, though exposed to infection from diphtheria in families and institutions, and during epidemics when the disease was raging, only 131 of those immunized were attacked later, and of these 129 were mildly affected (109 within thirty days, and 20 after a month), and recovered; while only 2 died of the disease, one within and other after thirty days from the time of injection. The two fatal cases probably received far too small doses to produce immunity, or the diphtheria was complicated with other diseases not mentioned. The mild cases all recovered, in some a repetition of the injection being given. Only some slight and temporary ill effects are described as having occasionally resulted from the immunizing injections, though in the Hospital des Enfants Malades and the Hospital Trousseau in Paris, and in Loh's experiments, full curative doses were often given to healthy subjects. Rashes, joint pains and other transient effects of the antitoxin serum were occasionally observed, but no serious effects which could be ascribed to the action of the anti-toxin, or which would contra-indicate its use.

SUMMARY OF TABLE XXII.

NUMBER OF CASES IMMUNIZED.	NUMBER OF ANTITOXIN UNITS INJECTED.	NUMBER OF THOSE IMMUNIZED ATTACKED WITHIN 30 DAYS.	NUMBER OF THOSE IMMUNIZED ATTACKED AFTER 30 DAYS.
17,516	50 to 1,000 (Average, 150 to 200.)	109 mild, 1 fatal.	20 mild. 1 fatal.

The prophylactive dose of antitoxin is now thought by most observers to be from 150 to 500 antitoxin units. The duration of immunity after injection has not been definitely determined, and undoubtedly varies. Some hold the opinion that it lasts one or two weeks, others that it extends over thirty days and more. Four weeks may probably be considered as the average duration.

CONCLUSIONS.

We desire to bring out strongly and clearly the fact that it matters not from what point of view the subject is regarded, if the evidence now at command is properly weighed, but one conclusion is, or can be reached, whether we consider the percentage of mortality from diphtheria and croup in cities as a whole, or in hospitals, or in private practice ; or whether we take the absolute mortality for all the cities of Germany whose population is over 13,000, and all the cities of France whose population is over 20,000 (in France and Germany antitoxin has been more generally employed than elsewhere) ; or the absolute mortality for New York City, or of the great hospitals in France, Germany and Austria ; or whether we consider only the most fatal cases of diphtheria—the laryngeal and operative cases ; or whether we study the question with relation to the day of the disease on which treatment is commenced, or the age of the patient treated ; it matters not how the subject is regarded, or how it is turned for the purpose of comparison with previous results, the conclusion reached is always the same, namely, there has been an average reduction of mortality from the use of antitoxin in the treatment of diphtheria of not less than 50 per cent., and under the most favorable conditions a reduction to one-quarter, or even less, of the previous death-rate. This has occurred not in one city at one particular time, but in many cities, in different countries, at different seasons of the year, and always in conjunction with the introduction of antitoxic serum, and proportionate to the extent of its use.

Then, finally, there is to be added not only the experimental proof of the specific action of antitoxin in neutralizing the toxin of diphtheria, but also the overwhelming mass of evidence derived from the personal observations of the most distinguished practitioners of medicine of every country. There are to-day in the whole civilized world not more than three or four active opponents of the antitoxin treatment of diphtheria whose names were known to the medical profession before the introduction of antitoxin.

It is well to bear in mind the fact that what is called conservatism in medicine is often only a cloak assumed to cover up indolence. The acceptance of a new principle, or a new fact, involves the expenditure of a certain amount of mental energy. Old ideas and conceptions must be discarded or readjusted to the new information acquired. This involves labor and effort, which some are not willing to expend. They are not willing to go over the data at hand and form conclusions for themselves, but shake their heads wisely, predict a reaction and plead for conservatism. It is not possible now for any unprejudiced person to master the evidence available regarding the value of antitoxin in the treatment of diphtheria and reach anything but a positive conclusion.

The deductions to be drawn from a review of these statistics and reports presented would seem to be self-evident and conclusive. The value of antitoxin in diphtheria is no longer a question of opinion or theory, but an established fact. "Probiren geht ueber studiren;"—those who have had the largest experience with the remedy, and have most thoroughly tested its merits, are most in favor of it. The few who oppose it have proved nothing in comparison with the enormous mass of evidence as to its specific value.

It may, therefore, be affirmed that the following facts have been demonstrated:

1. That diphtheria antitoxin, where generally employed, has reduced the mortality from diphtheria at least one-half.

2. That it has a distinctly favorable effect on the clinical course of the disease, shortening it and lessening its severity.

3. That the earlier the treatment is commenced the better the results obtained; the mortality, when adequate doses of antitoxin have been given within the first forty-eight hours of the disease, not exceeding 5 per cent.

4. That antitoxin is a specific against true diphtheria (*i. e.*, where the symptoms are due solely to the Klebs-Lœffler bacillus), and is less efficacious in mixed infections, but even in these forms of diphtheria is of decided benefit.

5. That it is not necessary to wait for a confirmatory bacteriological diagnosis, but that in every clinically suspicious case of membranous angina, especially in children, a medium dose of antitoxin should immediately be given, and repeated, if required by the further developments of the case.

6. That antitoxic serum is a remedy without serious after-effects in the doses which have ordinarily been employed (the after-effects, such as rashes, etc., being insignificant in comparison with the danger of the disease); that it has no injurious action on the kidneys, the heart, or the nervous system; that it does not entirely prevent albuminuria, heart failure and post-diphtheritic paralysis, because the effects of the diphtheritic toxin which has already entered the system before the administration of the remedy, no matter how soon the treatment is begun, are not always completely counteracted by the antitoxin, though there is every reason to believe that in sufficient doses it does prevent any further extension of the toxic action after its effects have been produced.

7. That the protection conferred by immunizing doses of antitoxin is almost absolute for a short period of time, *e. g.*, three or four weeks, when a sufficient number of antitoxin units is administered, and that with a high-grade preparation, where only small quantities of serum are required, the remedy is absolutely harmless even with the youngest infants.

8. That antitoxin, if not a specific cure for all forms of diphtheria occurring in the human subject, is by far the best remedy for the treatment of the disease.

TABLE XVI.

MORTALITY OF CASES TREATED WITH ANTITOXIN.

Number of Cases Treated with Antitoxin, Number and Percentage of Deaths, and Previous or Simultaneous Percentages of Death without Antitoxin.

REPORTER.	TREATED WITH ANTITOXIN.			PREVIOUS MORTALITY, PER CENT.	REFERENCES.
	Case.	Deaths.	Mortality, Per Cent.		
Roux, Martin and Chaillou (hospital)	300	78	26.0	50.0	Annales de l'Institut Pasteur, September, 1894 (cases in Hospital des Enfant Maladès).
Ehrlich, Kossel and Wasserman (hospital)	233	53	23.0	54.8	Behandlung der Diphtherie mit Behrings Heilserum, Kossel, Berlin, 1895.
Baginsky (hospital)	525	83	15.6	48.0	"Die Serum therapie der Diphtherie, Baginsky," Berlin, 1895.
Bokai (hospital)	120	31	25.8	60.2	Deutsche Med. Wochenschrift, 1895, No. 15, and Weiner Med. Presse, 1895, No. 12.
Korte (hospital)	121	40	33.3	57.4	Ibid, 1894, No. 45.
Hager (private practice)	25	1	4.0	....	Centralblatt für Innere Medicin, 1894, No. 48.

REPORTER.	TREATED WITH ANTITOXIN.			PREVIOUS MORTALITY, PER CENT.	REFERENCES.
	Cases.	Deaths.	Mortality, Per Cent.		
Moeller (hospital)	76	27	35.5	43.8	Ibid.
Hilbert (hospital)	11	0	0.0	....	Deutsche Med. Wochenschrift, 1894. Vereins-Beilage, page 42.
Baümler (hospital)	26	2	7.7	....	Münchener Med. Wochenschrift, 1894, page 1062.
Unterholzner (hospital)	37	8	21.6	66.7	Wiener Med. Wochenschrift, 1895, No. 4.
Kuntzen (hospital)	25	3	12.0	....	Deutsche Med. Wochenschrift 1894, No. 49.
Schmidt (private practice)	14	3	21.0	....	Ibid, 1894, No. 52.
Charon (hospital)	13	4	30.8	....	Annales des la Soc. Royale des Sciences Med. et Natur de Bruxelles, T. III., 1894.
Heim (hospital)	27	6	22.0	52.5	Wiener Med. Wochenscrift, 1895, No. 4.
Monti (hospital)	25	1	4.0	....	Ibid, Nos. 4 and 5.
Mya (hospital)	18	3	16.6	....	La Pediatria, 1894.
Silva (private practice)	17	1	5.8	....	Ibid, April, 1895.
Pecororo and De Blasi (hospital)	20	4	2 .0	50.0	Ibid, May, 1895.
Giarrè and Matucci (hospital)	46	13	28.2	....	Ibid.
Siegel (hospital)	100	12	12.0	50.3	München. Med. Wochenschrift, 1895, No. 21.
Borger (hospital)	100	8	8.0	25.0	Deutsche Med. Wochenschrift. 1895, Nos. 21 and 52.
Schüller (private practice)	32	1	3.1	....	Allgemein Med. Central Zeitung, 1894, No. 88.
Sonnenburg (hospital)	107	22	20.4	27.6	Deutsche Med. Wochenschrift, 1894, No. 50.
Seitz (private practice)	27	1	3.8	30.0	Therapeut. Monatshefte, 1894, No. 12.
Goodall, Washburne and Card (hospital)	177	37	20.8	30.8	British Med. Journal, December, 1894, and Meeting of the Med. Assoc., July, 1895.
Le Gendre (hospital)	17	2	12.5	55.0	Bulletin des Hopitaux, December, 1894 (Hospital Trousseau).
Moizard and Perregaux (hospital).	231	34	14.7	55.0	Gazette des Hopitaux, 1894 Dec., No. 144 (Hospital Trousseau).
Sevestre and Meslay (hospital)	150	15	10.0	55.0	Le Bulletin Medical, 1895, No. 18 (Hospital Trousseau.
Lebreton and Magdelaine (hospital)	258	31	12.0	55.0	Ibid, 1895, No. 10 (Hospital des Enfants Malades.)
Ganghofner (hospital)	110	14	12.7	60.5	Prager Med. Wochenschrift, 1895, Nos. 1 and 3.
Von Wiederhofer (hospital	800	160	18.0	42.8	New York Medical Record, Feb. 1, 1896.
Heubner (hospital	207	27	13.0	50.0	Reported at the 13th Medical Congress in Munich, April 2, 1895.
Heubner (hospital)	117	12	10.2	50.0	Deutsche Med. Wochenschrift, 1895, No. 42.
Stinzing (hospital)	59	12	20.3	25.0	Reported at the 13th Medical Congress in Munich, 1895.
Rauchfuss (hospital)	34	7	21.0	55.0	Ibid.
Von Mehring (hospital)	74	4	5.0	30.0	Ibid.
Von Noorden (hospital)	81	19	23.0	45.0	Ibid.
Schroeder (hospital)	63	8	12.7	33.5	Ibid.
Von Ranke (hospital)	225	43	19.1	50.0	Reported at the meeting of the Deutsche Naturforscher at Lübeck, Sept., 1895.
Vierordt (hospital)	63	16	25.0	54.0	Deutsche Med. Wochenschrift, 1895, No. 11.
Rampf (hospital)	22	2	8.0	25.0	Münchener Med. Wochenschrift, 1894, No. 20.
Epidemic Trieste (private practice)	72	5	6.5	43.0	Oestreichisches Sanitätswesen, 1895, No. 1.
Epidemic Trieste (hospital)	180	40	22.2	50.0	Ibid.
Epidemic in Berkowina (private practice)	33	7	21.2	61.0	Ibid.
Epidemic in Berkowina (neighboring districts)	36	4	11.1	40.0	Ibid.
Blumenfeld (private practice)	50	2	4.0	38.0	Wiener Klin. Wochenschrift, 1895, No. 3.
Pavlik (private practice)	13	1	5.7	....	Münchener Med. Wochenschrift, 1895, No. 12.
Santucci and Mucci (hospital)	13	3	23.0	57.0	La Sperimentale, 1895, No. 5.
Berkowitz (hospital)	12	6	50.0	60.0	
Handler (private practice)	32	5	14.6	70.0	Wiener Med. Presse, 1895, No. 6.
Simonovic (private practice)	8	0	0.0	40.0	Ibid.
Gerloczy (hospital)	55	15	27.3	....	Therapeut Wochenschrift, 1895, No. 9.
Rosenthal (private practice)	222	13	5.8	....	"Antitoxin treatment of Diphtheria," read before the Phila. Med. Society, 1895.
Seibert (private practice)	28	2	7.1	....	Archiv. of Pediatrics, July, 1895.
Caillé (private practice)	41	7	17.1	....	Ibid.
Seitz (private practice)	235	20	8.17	....	Munch. Med. Wochenschrift, 1896, No. 20.
Engel Bey (hospital, Cairo)	79	28	35.4	60.0	Berlin Klin. Wochenschrift, 1895, No. 37.
Fürbringer (hospital)	27	1	4.9	....	Jahresbericht S. Städt Revant. L. Friedrichshein, 1895. (Note—These were adults.)
Wessener (private practice)	95	10	11.3	44.0	Münch. Med. Wochenschrift, 1895, No. 38.
Pürckhauer (hospital)	18	3	16.6	....	Ibid, 1895, No. 48.

Reporter.	Treated with Antitoxin.			Previous Mortality, Per Cent.	References.
	Case.	Deaths.	Mortality, Per Cent.		
Mazzotti & Bachi (private practice)	58	2	3.4	....	Commin. Soc. Med. Chir. di Bologna, 1895, July 19.
Clessin (private practice)	22	0	0.0	42.8	Münch. Med. Wochenschrift, 1896, No. 7.
Revillod (private practice)	63	4	6.4	35.6	Revue Med. de la Suisse rom., 1896, No. 2.
Kobler (hospital)	50	6	12.0	....	Wien. Klin. Wochenschrift, 1896, Nos. 4 and 5.
Wieland (hospital)	109	28	25.7	55 to 59	Korrespond. bl. f. Schweizer Aerzté, 1896, No. 3.
Ssamgin (hospital)	314	61	18.4	33 to 39	St. Petersberg Med. Wochshft. Russ. Med. Lit., 1896, No. 3.
Ostrogossky (hospital)	20	0	0.0	....	Ibid, Russ. Med. Lit., 1896 (in a cadet school).
Dreyer (hospital)	310	62	20.0	....	Ibid, Med. Lit., 1896.
Gertgustri (hospital)	120	15	20.8	60.0	Ibid, Russ. Med. Lit., 1896, No. 5
Kalimkow (private practice)	11	3	21.6	....	Ibid.
Rosenberg (private practice)	13	2	15.3	....	Ibid.
Setzchkarew (private practice) ..	100	19	19.0	....	Ibid.
Bondarew (private practice)	16	4	25.0	75.0	Ibid.
Oleinickow (hospital)	166	37	22.3	46.0	Bolnitznaja Gazetta, 1896, No. 10. Brit. Med. Jour., August 8, 1896.
Janowski (hospital)	32	3	9.3	40 to 50	Wien. Klin. Wochenschrift, January, 1896. Archiv. f. Kind. Heilk'de. XX., 1896.
Kurt Müller (hospital)	71	28	40.0	56.4	Allgem. Med. Zeitung, 1896, February, 1896.
Welch (hospital)	302	85	28.1	25.9	New York Med. Record, March 7, 1896.
McCullom (hospital)	844	96	11.3	....	Boston Med. Jour., February 18, 1896.
Aaser (hospital)	212	21	9.9	20.0	Allgem. Med. Zeitung, February 22, 1896 (Sweden).
Smith (private practice)	71	3	4.2	22.5	Ibid (Sweden).
Tidswell (Health Board, New South Wales)	55	7	12.7	....	Brit. Med. Jour., February 1, 1896.
Board of Health, Denver	37	3	8.2	30.0	
Martyn (hospital)	24	6	25.0	66.0	British Med. Jour., February 15, 1896.
Barnett-Bentliff (hospital)	10	3	30.0	....	Ibid, March 14, 1896 (Jersey Infirmary).
Gimlette (hospital)	10	0	0.0	....	Ibid (Naval Station).
Steele (hospital)	14	2	14.0	....	Ibid (Plaistow).
Peck (hospital)	13	2	15.0	40.0	Ibid (Ormskirk District).
Virneisel (hospital)	150	19	12.7	....	Münch. Med. Wochshft., No. 19, 1896.
Thuróczy (private practice)	400	63	15.7	48.7	Allgem. Med. Central Zeitung, 1896, No. 77.
Sverensen (hospital)	63	17	26.9	33.1	Therapeut. Monatshft., 1896, No. 3.
Fürth (Clinic)	150	23	15.3	38 to 50	Münch. Med. Wochshft., 1896, No. 19.
Chicago Health Board	1,468	94	6.4	....	Report of the Department, from October 5, 1895, to April 1, 1896.
Kitasato, Japan	353	31	8.7	56.5	New York Med. Record, April 4, 1896.
Zuppinger (Hospital)	160	40	25.0	41.0	Wien. Klin. Wochshft., 1896, No. 22.
Clubb & Lichfield (hospital)	100	23	23.0	51.0	New York Med. Record, June 20, 1896 (Australia).
Herald (Newark Health Board).	660	85	12.8	41.4	Ibid, May 2, 1896.
Paltauf (Collective Investigation, Vienna)	1,217	138	11.3	....	Münch. Med. Wochshft., 1896, No. 37.
Knoepfelmacher (hospital)	100	21	21.0	40 to 50	Wien. Klin. Wochshft., 1896, No. 3.
Marsh (hospital)	179	25	14.0	35 to 40	Glasgow Med. Jour., IV., 1896.
Metropolitan Asylums' Board, London	2,182	615	28.1	29.6 to 34	Report of Metropolitan Asylums' Board (London Hospital), for the year 1895, March, 1896.
Americ. Ped. Soc. (private practice)	3,384	450	13.0	....	Report of the American Pediatric Society's Collective Investigation, July, 1896.
Crohn (private practice)	150	5	3.3	....	Deutsche Med. Wochshft., 1896, No. 17.
Blumenfeld (private practice)	229	20	8.7	23.0	Wien. Klin. Wochshft., 1896, No. 13.
Neurath (hospital)	200	34	17.0	46.1	Ibid, 1896, No. 35.
Witthauer (hospital)	36	5	14.9	....	Therapeut. Monatshefte, 1895, February.
Withington (hospital)	50	13	16.0	30.0	Boston Med. & Surg. Journal, March, 1895.
Reisel (Hospital)	25	3	7.9	....	Deutsche Med. Wochenschrift, 1895, No. 10.
" (private practice)	89	6			Ibid.
Heidenhain (private practice)	24	3	12.5	....	Berliner Klin. Wochenschrift, 1895, No. 10.
Schaewen (private practice)	15	0	0.0	....	Ibid.
Grünfeld (hospital)	12	1	8.3	....	Abstract Schmidt's Gahrbüch, Bd. 246, 1895.
Rapmund (private practice)	100	7	7.0	25.0	Zeitschrift für medizinal Beamte, 1895, Feb. (Collective report).
Von Muralt (hospital)	58	2	3.4	....	Correspondenzblatt für Schweizer Aerzte, 1895, No. 5.
Weiland (private practice)	20	0	0.0	....	Deutsche Med. Wochenschrift, 1895, No. 10.
Blattner (hospital)	38	9	23.6	....	Abstract in Münchener Med. Wochenschrift, 1895, March.

REPORTER.	TREATED WITH ANTITOXIN.			PREVIOUS MORTALITY, PER CENT.	REFERENCES.
	Case.	Deaths.	Mortality, Per Cent.		
D'Espine (hospital)	60	6	10.0	....	Revue Medical de la Suisse Romande, 1895. (40 cases in hospital).
Von Engel (hospital)	39	10	25.0	50.0	Prager med. Wochenschrift, 1895, No. 13.
Louis Fischer (hospital and private)	225	35	15.5	....	New York Medical Record, April, 1895.
Reuffer (hospital)	274	37	13.5	....	The Lancet, January, 1895. (Cases in London Hospital).
Codd & Whitehouse (hospital)	11	4	36.4	....	British Med. Journal, May 18, 1895.
Winkfield (hospital)	22	4	18.2	36.0	Ibid, May 21.
Horowitz (hospital)	21	1	4.8	10.7	Abstract in Münch. Med. Woch., 1895, No. 7.
Vucetig (private practice)	30	2	6.6	20.0	Allgemein. Wiener Med. Zeitung, 1895, Nos. 14, 15 and 16.
Van Nes (hospital)	52	12	23.0	....	Deutsche Med. Wochenschrift, 1895, No. 23.
Lichtenstern & Wendelstadt (hospital)	123	25	20.3	....	Münch. Med. Wochenschrift, 1895, No. 24.
Jakerbowski (hospital)	100	30	30.0	50.0	Prager Med. Wochenschrift, 1895, No. 20.
Soltmann (hospital)	270	57	21.1	48.3	Reported at the meeting of the "Deutsche Naturforscher u. Aertze" in Lübeck, September, 1895.
Eisenstädter (private practice)	103	10	9.6	....	
Kurth (hospital)	97	10	10.3	....	Deutsche Med. Wochenschrift, 1895, July. (35 cases in hospital.
Howard (private practice)	40	3	7.5	....	Medical News, Jan 1, 1895.
Hahn (hospital)	205	49	24.6	42.0	Deutsche Med. Wochenschrift, 1895, p. 930.
Dreyfus (hospital)	78	15	19.2	50.0	Lyon Medical Journal, 1895.
Escherich (hospital)	51	5	9.2	....	Münchener Wochenschrift, 1895. No. 7.
Guändinger (hospital)	27	11	40.7	45.5	Wiener Klin. Wochenschrift, 1895. No. 52.
Cases in Cartagena (private practice)	156	21	13.46	....	Union de las Ciencias Medicas (British Med. Journal, 1895, July), Spain.
Germonig (hospital)	224	44	20.3	55.0	Reported in the British Med. Journal, 1895, January (cases in Austro-Hungary).
Mathews (hospital)	61	10	16.3	30.8	Ibid, 1896 (cases in London Fountain Hospital).
MacCombie (hospital)	102	15	14.7	....	Ibid (cases in London Southeastern Hospital).
Gayton (hospital)	43	2	4.6	....	Ibid (cases in London Northwestern Hospital).
Bruce (hospital)	68	10	14.7	....	Ibid (cases in London Western Hospital).
Hall (hospital)	11	3	27.0	....	Ibid, January, 1895 (cases in County Monaghan Hospital, Ireland).
Valentine Brown (private practice)	35	2	5.6	....	New York Med. Record, April 27, 1895.
Davies (private practice)	21	0	0.0	....	Ibid.
Fraser (hospital)	95	22	23.0	....	British Med. Journal, 1895.
Caiger (hospital)	11	3	27.0	....	Ibid.
Simon (private practice)	18	3	16.6	....	La Medicin Moderne, 1895, reported in British Med. Journal.
Zabalatnui (hospital)	109	14	12.8	....	Journal of the American Medical Assoc., October 5, 1895.
Gougenheim (hospital)	125	12	9.5	....	Anneles des Malades de l'Oreille, du Larynx, du Nes et du Pharynx, 1895, No. 5.
Fürth (hospital)	100	12	12.0	39.0	Münchener Med. Wochenschrift, 1895, No. 30.
Timmer (hospital)	147	13	8.8	40.0	Deutsche Med. Wochenschrift, 1895. No. 37.
Springoram (hospital)	206	78	37.9	25.0	Ibid, Nos. 31 and 32.
Johnston (hospital)	105	15	15.4	35.0	British Med. Journal, 1895.
Mason (hospital)	306	81	26.4	48.0	Reported to Association of American Physicians, May 31, 1895. Medical News, June, 1895.
Raw (hospital)	16	2	12.5	47.0	British Medical Journal, Feb. 15, 1896.
Roberts (hospital)	13	2	15.4	....	Ibid.
Sidney Martin (hospital)	75	21	28.0	37.8	Ibid, January, 1896.
Berliner (hospital)	42	2	4.7	....	Jahrbuch fr. Kind., Heilkunde, Vol. 19, 1896.
Total in 158 reports	24,768	4,004	16.0	....	

In a total of 24,768 cases treated with antitoxin, according to 158 reports from hospitals and private practice, there were 4,004 deaths, or a mean mortality of 16 per cent.

In 109 reports from hospitals there were 15,560 cases treated with antitoxin in hospital, with 3,009 deaths, giving an average mortality of 19 per cent. In 49 reports from private practice, there were treated 9,208 cases, with 995 deaths, giving a mortality of 10.1 per cent. for the cases treated in private practice.

The table also shows the mortality percentage, in many instances, of cases treated without antitoxin simultaneously or previous to the introduction of the serum treatment.

TABLE XVII.

MORTALITY OF CASES TREATED WITH AND WITHOUT ANTITOXIN.

Number of Cases Treated with and without Antitoxin—Number and Percentage of Deaths during Intervals of Forced Interruption, or Immediately Before or After, during the same Period.

Reporter.	Treated with Antitoxin.			Treated without Antitoxin. Simultaneously, or during a period immediately before or after antitoxin treatment.			Remarks.
	Cases.	Deaths.	Mortality, per cent.	Cases.	Deaths.	Mortality, per cent.	
Roux (Hospital des Enfants Malades)	300	78	26.0	..	..	....	During the same months that these cases were treated with antitoxin, at another hospital in Paris the old method was being employed.
Roux (Hopital Trousseau)	..	..	....	520	316	60.0	
Körte (Hospital am Urban, Berlin)	121	40	33.3	106	56	53.8	These two groups of cases were treated during the same epidemic, with a difference of 20 per cent. in favor of antitoxin.
Moeller (Magdeburg Clinic)	76	27	35.5	212	93	43.8	The cases without serum were treated from April to November, 1894, just before antitoxin was introduced, with a mortality of 8.3 per cent. more than with antitoxin. The operated cases showed a difference of 16 per cent. in favor of the new treatment.
Sonnenburg (Hospital Moabit, Berlin)	107	22	20.4	116	32	27.6	These cases were not injected, because no serum was to be had at the time, April to July, 1894; of the non-injected cases, the mortality was 7 per cent. more than that of the injected cases; of the operated cases, 14.5 per cent. more.
Goodall (London City Hospital)	177	38	21.4	208	73	35.0	These were control cases, treated with and without antitoxin at the same time. There were two sets of cases, one in December, 1894, the other in January, 1895.
Seits (Constance, private practice and hospital).	27	1	3.8	293	88	30.0	These cases were treated with and without antitoxin during the same epidemic; of 159 cases treated in hospital without antitoxin, 41.5 per cent. died.
St. Anna Hospital, Vienna, under superintendence of Professor V. Wiederhofer	159	40	25.15	..	..	....	The results of antitoxin treatment are here evident. The first 159 cases were treated during 1894, the 560 cases (being the total number treated up to July, 1895), showing a still further reduction of mortality—19 per cent. as against 50 per cent.
	560	97	19.1	760	385	50.65	
Ganghofner (Franz Josef-Kinder Clinic in Prague)	110	14	12.7	144	62	43.0	These 144 cases were treated without antitoxin during an interval of forced interruption, owing to the failure of the supply of serum, and immediately preceding the introduction of serum-therapy. The mortality of operated cases was 61 per cent. without and 13.6 per cent. with antitoxin.
Unterholzner (hospital)	37	8	25.8	36	24	66.0	Unterholzner had a similar experience of rise in the fatality of his cases during an interval of treatment without antitoxin.
Heim (hospital in Vienna)	27	6	22.0	236	122	52.0	The cases without antitoxin were treated just before the serum period, and some during a period of forced interruption.

REPORTER.	TREATED WITH ANTITOXIN.			TREATED WITHOUT ANTITOXIN. SIMULTANEOUSLY, OR DURING A PERIOD IMMEDIATELY BEFORE OR AFTER ANTITOXIN TREATMENT.			REMARKS.
	Cases.	Deaths.	Mortality, per cent.	Cases.	Deaths.	Mortality, per cent.	
Epidemic in Trieste and surrounding districts in Austro-Hungary	321	56	17.1	427	213	50.0	In this epidemic, which raged during the months of August and November, 1894, over 4 per cent. of the inhabitants were attacked, and 50 per cent. of these not treated with antitoxin died. Antitoxin was procured by the Austrian Government, all fresh cases were injected, with a mortality of 17 per cent., on an average; others exposed to the disease were immunized, and thus the epidemic was controlled.
Blumenfeld (private practice)	50	2	4.0	50	19	38.0	These two groups of cases were treated at the same time.
Santucci and Mucci (hospital)	13	3	23.0	7	4	57.0	These cases were treated at the same time. 11 of the 13 serum cases were operated.
Handler (private practice)	32	5	14.6	7	6	85.0	These cases were carefully conducted at the same time, to test the value of antitoxin, in a country district in Hungary.
Witthington (hospital)	50	13	16.0	40	12	30.0	These cases were treated together, and the serum cases were said to be the most severe. The cases were in the Boston City Hospital.
V. Engel (Asylum for Children in Brünn, Bohemia)	39	10	25.5	62	31	50.0	These cases were treated at the same time. The serum cases are stated to have been unusually severe, all mild or doubtful cases being excluded.
Baginsky (Kaiser u. Kaiserin, Friederich Hospital, Berlin)	525	83	15.6	230	70	47.8	Most of the non-injected cases were treated during a period of forced interruption, the serum having given out. As soon as the antitoxin treatment was begun again, the mortality dropped from 47.8 per cent. to 15 per cent.
Vucetig (private practice in Schabatz, Austria)	30	2	6.6	30	6	20.0	The one series of cases were treated with various kinds of antitoxin, the other with Loeffler's mixture.
Rauchfuss (hospital in Russia)	34	7	21.0	30	16	52.0	These were control cases treated at the same time.
Stinzing (hospital)	59	12	20.3	59	14	25.0	Treated during the same period.
Hahn (hospital, Berlin)	205	49	24.0	225	92	41.0	
Matthews (hospital, London)	61	10	16.3	123	38	30.8	
Germonig (hospital, Trieste)	224	44	20.3	65	33	50.7	
Springorum (hospital, Madgeburg)	206	78	37.9	482	122	25.3	Only the severest cases were taken here for serum treatment, over 50 per cent. requiring operation within a short time after admission to hospital.
Soltmann (hospital, Leipzig)	181	44	24.2	15	12	80.0	These were control groups, treated at the same time.
Sidney Martin (hospital, London)	75	21	28.0	64	25	39.0	The cases without antitoxin were treated during the second half of 1894; others in 1895.
Welch (hospital, Philadelphia)	300	85	28.1	455	136	25.9	The antitoxin used in these cases, made in Philadelphia, is reported to have been too weak for general distribution (Medical Record, New York, March 7, 1896).
Denver Health Board	37	3	8.8	75	22	30.0	

							last quarter of 1894, 180 cases were treated, with 40 deaths (22.2 per cent.) showing that the severity of the epidemic had not lessened.
Austrian statistics (hospitals and private practice)	1,128	149	13.2	1,849	704	38.1	These cases were treated during the month of February, 1896, throughout all Austria.
Thuvoczy (private practice, Bohemia)	400	63	15.7	706	344	48.7	
Fürth (Clinic, Freiburg)	150	23	15.3	145	56	38.6	Fürth's cases without serum were treated 1893–94; 1894–5, 144 cases, treated partly with serum, gave a mortality of 19.4 per cent.
Blumenfeld (private practice)	229	20	8.7	48	11	23.6	The cases without antitoxin were thought to be mild, and as serum was scarce, were not injected.
Sverensen (hospital, Denmark)	63	17	26.9	46	15	33.0	These were very severe cases and taken therefore as tests. S. also reports 385 mild cases treated without serum, with a mortality of 16 per cent. S. does not see any better results with antitoxin than without. (Therapeut. Monatsheft, 1896, No. 3.
Clessin (private practice, Egenhofen)	22	0	0.0	7	3	42.8	
Neuvath (hospital, Vienna)	200	34	17.0	633	292	46.1	The cases without serum were treated during the five years previously. The last 100 cases treated with serum, 1895–6, gave a mortality of 13 per cent.; deducting 5 moribund, only 8.4 per cent.
Revillod (private practice, Switzerland)	62	4	6.4	289	103	35.6	The cases without serum were treated during the five years previously.
Martyn (hospital, Hackney, England)	24	6	25.0	27	15	66.6	The non-serum cases occurred in 1894, just before antitoxin was used.
Middlesex (hospital reports, England, 1895)	29	4	13.8	155	65	41.9	The cases without serum occurred from 1890–94 in this hospital.
Peck (Health Officer, Ormskirk)	13	2	15.0	10	4	40.0	
Marsh (hospital, Glasgow)	179	25	14.0	245	87	35.5	The cases without serum were in 1894; from 1890–94 the average mortality was 38 per cent.
Clubbe and Litchfield (hospital, Australia)	100	23	23.0	100	51	51.0	
Herald (Newark Health Board)	660	85	12.8	338	138	41.4	
Metropolitan Asylums' Board, London	3,529	796	22.5	3,042	902	29.6	Antitoxin was only used in the severe cases; the mild were not injected. The figures include all cases treated in 1895 and 1894, showing a reduction in mortality since antitoxin was used of 7.1 per cent. For children under five years of age there was a reduction of 13.2 per cent.; of those treated on first and second days of disease, 10 to 14 per cent. Moreover, the antitoxin used, prepared in London, does not appear to have been of uniform strength (see report of Commissioner in "Lancet," 1896).
In a total of 45 reports	11,147	2,169	19.1	13,294	5,026	37.8	

In a total of 45 reports there were 11,147 cases treated ***with antitoxin***, of which 2,169 died, or 19.1 per cent; while at the same time, or just before or after, there were treated 13,294 cases ***without antitoxin***, with 5,026 deaths, giving a mortality of 37.8 per cent, or about 50 per cent. more than with antitoxin.

In hospitals alone there were treated 7,986 cases with antitoxin, resulting in 1,754 deaths, or a mortality of 21 per cent., as against 9,039 cases treated without antitoxin, resulting in 3,309 deaths, or a mortality of 36.4 per cent.

In private practice there were treated 3,161 cases with antitoxin, resulting in 412 deaths, or a mortality of 13 per cent., as against 4,255 cases treated without antitoxin, resulting in 1,717 deaths, or a mortality of 40 per cent.

Thus the table shows that both in hospital and private practice the mortality in diphtheria has been reduced by about one-half as the result of antitoxin treatment, in spite of the fact that many of these cases reported at this period were the severest cases occurring at the time, and intentionally taken as tests of the antitoxin treatment.

TABLE XIX.

Mortality of Operative and Non-operative Cases Treated with Antitoxin, giving also the Previous Mortality in Operated Cases without Antitoxin.

(T. = Tracheotomy ; I. = Intubation ; I. & T. = Intubation and secondary tracheotomy ; I. or T. = Intubation or tracheotomy.)

REPORTER.	TOTAL CASES TREATED.			NON-OPERATED CASES.			OPERATED CASES.			PREVIOUS MORTALITY IN OPERATED CASES.	REMARKS.
	Cases.	Deaths.	Mortality, Per Cent.	Cases.	Deaths.	Mortality, Per Cent.	Cases.	Deaths.	Mortality, Per cent.		
Roux, Martin & Chaillou......	300	78	26.0	179	22	12.8	121 T.	56	46.0	67 to 79	Deducting 14 cases who died within 24 hours after admission, there were 107 tracheotomies, with 42 deaths (39.2 per cent.).
Kossel........................	117	13	11.1	94	1	1.1	23 T.	12	52.2	....	Of 44 laryngeal cases, 21 recovered without operation.
Körte........................	121	40	33.1	79	18	22.8	42 T.	22	52.4	72.7	Of 8 operated on under 2 years of age, 5 died (62.5 per cent.); before, 90 (7 per cent.).
Bókai.........................	120	31	25.5	71	10	14.0	49 I.	21	43.0	....	Of 63 laryngeal cases, 14 escaped operation; the average duration of intubation was 58 hours; before, 80½ hours.
Moeller.......................	76	27	35.5	28	8	28.6	48 T.	19	39.5	55.5	
Boerger.......................	30	2	6.6	25	1	4.0	5 T.	1	20.0	....	
Sonnenburg....................	107	22	20.4	73	8	10.9	34 T.	8	23.5	38.0	Among these are included all cases, 6 mild and 6 moribund.
Goodall, Washbourne & Card.	72	14	19.4	63	11	17.5	9 T.	3	33.3	85.5	In 13 previous series of 9 tracheotomies the mortality averaged 85.5 per cent. Deducting 15 cases who died within 24 hours after admission, the total mortality would be only 9.7 per cent.
Le Gendre.................. Moizard & Perrigaux....... Sevestre & Meslay..........	398	52	13.1	316	23	7.6	82 { 51 T. 21 I. 10 I. or T. }	29 { 20 T. 5 I. 4 I. or T.	39.2 23.8 40.0 (35.4)	86.0 T.	(Cases in Hospital Trousseau, September to December, 1894).
Ganghofner....................	110	14	12.7	66	8	12.0	44 I. or T.	6	13.6	61 to 70	Of 44 operated cases, 17 were under 2 years of age; mortality, 23.3 per cent. Of 62 cases with beginning laryngeal stenoses, all escaped operation; 12 with distinct laryngeal stenoses recovered without operation; 22 laryngeal cases escaped operation.
v. Wiederhofer................	300	71	23.7	192	20	10.4	108 I. or T.	51	47.2	....	

Lebreton & Magdelaine	258	31	12.0	183	8	4.4	75 { 24 T. 51 I.	23 { 9 T. 14 I.	37.5 27.4	73.2 T.	Deducting 8 cases admitted in a hopeless condition, there were 250 cases, with 23 deaths (9.2 per cent.). Of the 14 fatal cases of intubation, 7 died within 24 hours after admission, deducting which the mortality in intubation was 18.7 per cent.
v. Ranke	225	43	19.1	157	22	14.0	68 { 46 I. 22 T.	21	30.9	59.5 to 75.4	Of 108 cases with beginning laryngeal stenosis, 40 escaped operation. The duration of intubation was from 50 to 60 per cent. less than previously without antitoxin.
Stinzing	59	12	20.1	43	5	11.6	16 T.	7	44.0	49.0	
Schroeder	63	8	12.7	32	5	15.6	31 T.	3	9.7	....	
Eisenstädter	103	10	9.6	100	7	7.0	3 T.	3	100.0	....	Four of these cases were moribund on admission.
Kurth	97	10	10.3	82	7	8.5	15 T.	3	20.0	....	Of 32 laryngeal cases, not operated on, 30 recovered.
Baginsky	525	83	15.6	430	47	10.6	95 { 53 T. 54 I. (12 I.&T.)	36 { 34 T. 2 I.	37.8 T. (37.9)	64.4 T. 44.8 I.	12 cases of the 54 intubations were secondary tracheotomies, of whom 12 died, making the total mortality 37.9 per cent. During a period of interrupted serum treatment for 2 months the total mortality rose to 48.4 per cent., for operated cases to 62.2 per cent.; this dropped again on resumption of antitoxin treatment.
Soltmann	181	44	24.3	118	17	14.4	63 { 58 I. 5 T.	27 { 25 I. 2 T.	43.1 I. 40.0 T.	50 to 85.7	Of 15 cases treated at the same time without serum, 80 per cent. died; of 7 operated cases (6 intubations and 1 tracheotomy), 85.7 per cent. and 50 per cent. died respectively.
Börger	100	8	8.0	84	5	5.9	16 T.	3	18.7	....	In these were many severe cases, 19 septic, it is reported.
Louis Martin	526	..	....	451	..	....	75 { 72 I. 3 T.	17 { 16 I. 1 T.	22.2 33.3 (23.5)	77.0	Among the 16 deaths under intubation, 8 died within 24 hours after admission, deducting which there were 64 intubations with 8 deaths, or 13.5 per cent. mortality. The number of operations in this hospital (Trousseau) since serum treatment was begun, has been reduced from 36 per cent. to 14 per cent. of all cases admitted.
Germonig	224	42	18.7	178	18	10.0	46 { 44 I. 2 T.	24 I.	54.5 I.	75.0 I. 85.5 T.	65 cases treated at the same time gave a total mortality of 50 per cent.
Witthauer	36	5	13.9	16	1	6.2	20 T.	4	20.0	....	
Gougenheim	125	12	9.5	121	10	8.3	4 T.	2	50.0	....	Of the 125 cases, 77 were adults, 3 died (3.9 per cent.); 48 children, 9 died (18.7 per cent.).

Reporter.	Total Cases Treated.			Non-operated Cases.			Operated Cases.			Previous Mortality in Operated Cases.	Remarks.
	Cases.	Deaths.	Mortality, Per Cent.	Cases.	Deaths.	Mortality, Per Cent.	Cases.	Deaths.	Mortality, Per Cent.		
Fürth	100	12	12.0	69	1	14.5	31 T.	11	35.4	70.4	15 of the 100 were not injected, as 2 were moribund, and the remainder for want of serum, which would make the actual mortality of serum cases 14.1 per cent.; 44 were laryngeal cases, of whom 13 escaped operation.
Timmer	147	13	8.8	96	4	4.2	51 I. or T.	9	18.0	51 to 67.5.	
Mason	306	81	26.4	275	62	22.5	31 I. or T.	19	61.0	....	
Rumpf	22	2	8.0	15	..	....	7 T.	2	28.6	....	
Heim	27	6	22.0	21	4	19.0	6 { 2 T. 4 I.	1 T. 1 I.	50.0 25.0 (33.3)	65.6	During a period of interrupted serum treatment the mortality was 65.6 per cent.
Kuntzen	25	3	12.0	20	1	5.0	5 T.	2	40.0	....	
Charon	13	4	30.8	2	..	....	11 T.	4	36.4	....	
Gerloczy	55	15	27.3	50	13	26.0	5 I.	2	40.0	....	41 cases were under 5 years of age, 14 very severe.
Risel	114	9	7.9	95	5	5.3	19 T.	4	21.0	....	
Vierordt	55	8	14.6	40	1	2.7	15 T.	7	40.0	....	8 cases in a hopeless condition on admission are not included.
v. Engel	39	10	25.5	30	7	23.3	9 T.	3	33.3	85.0	Of 42 unoperated cases without serum, 14 died (33.4 per cent.); of 20 tracheotomized, 85 per cent. died; all serum cases were severe.
Heidenhain	24	3	12.5	22	2	9.1	2 T.	1	50.0	....	
v. Muralt	58	2	3.4	38	..	....	20 { 2 T. 14 I. 4 I. & T.	2	10.0	....	In 14 cases of intubation, no deaths; after intubation and secondary tracheotomy, 1 death; in tracheotomy alone, 1 death.
Van Nes	52	12	23.0	30	4	13.3	22 { 15 T. 7 I.	8	36	63.0	Of 1,000 cases previously treated without serum, 66 per cent. were operated upon; since serum treatment, only 12.3 per cent. Before, only 37 per cent. of the operated cases recovered; since the introduction of antitoxin, 64 per cent. recovered.
Lichtenstern & Wendelstadt	123	25	20.3	86	9	10.4	37 T.	16	43.2	64.6	The total mortality in these cases was reduced both for non-operated and operated cases, but not the number of operations required. The cases were not controlled by bacteriological examinations.
Jakubowski	100	30	30.0	42	10	23.8	58 I.	20	34.4	52.8	The 58 laryngeal cases were all intubated, followed by 4 secondary tracheotomies.

Siegel	100	12	12.0	....	....	....	....	....	20.3	63.3	The number of cases operated on is not given.
Kohts	39			....	....	....	7.0	....	29.4	....	Previously, in 1893, the mortality in non-operated cases was 69 per cent., and in operated cases 25 per cent. Number of cases not given.
Springorum	206	78	37.9	93	26	27.9	113 T.	52	46.0	55.7	In these cases it appears that there was comparatively little reduction in mortality from serum treatment; but the number of operations necessary was less. The treatment was conducted irregularly at first; afterward only the severest cases were injected.
Codd & Whitehouse	11	4	36.4	7	2	28.6	4 { 3 T. 1 I.	} 2 T.	66.0	....	
Winkfield	22	4	18.2	19	2	10.5	3 T.	2	66.0	85.7	
McCullom	844	96	11.0	765	60	7.9	79 I.	36	45.0	86.0	During the period just before antitoxin, there had been 86 intubations and 74 deaths.
Sidney Martin	75	21	28.0	45	11	24.4	30 T.	10	33.3	47 to 78.0	There were 48 children under 5 years of age, of whom 7 died (35.6 per cent.); in previous years 50 to 60 per cent. All these 7 cases were admitted late in the disease.
Raw	16	2	12.5	8	1	12.5	8 T.	1	12.5	88.8	British Med. Journal, Feb. 15, 1896.
Kurt Muller	71	28	40.0	19	2	10.5	52 T.	26	50.0	....	Of 39 cases treated at the same time without serum, 31 per cent. died; of 25 operated cases only 40 per cent. But the serum cases were many of them injected late in the disease and several were septic cases.
Aaser	212	21	9.9	163	5	30.7	49 { 40 I. 1 T. 8 I. & T.	11 I. 1 T. 4 I. & T.	27.5 100.0 50.0	} 77.4	140 cases at the same time, showing Loeffler bacilli, were so mild that they were not injected and 8 others showing no bacilli but characteristic clinical symptoms were injected. Of the total number (352 cases) treated, only 5.9 per cent. died. Of those treated with antitoxin under 5 years of age, 15.4 per cent. died; of the remainder, 7 per cent. Before the introduction of serum the mortality in operated cases was 77.4 per cent., and the recoveries 22.6 per cent.; now the mortality was 29.2 per cent., and the recoveries 70.8 per cent., reversing the figures.
Virneisel	150	19	12.7	86	4	4.6	64 T.	15 T.	23.4	60.0	These include 5 moribund and 64 cases in a condition of extreme dyspnœa.
Thuróczy	400	63	15.7	399	63	15.9	1 I.	....	....	....	With exception of one intubation, no operations were required in the laryngeal cases.
Fürth	150	23	15.3	115	8	7.0	35 T.	15 T.	42.8	67 to 82.0	In previous years 45 to 50 per cent. required operation; in 1895 and 1896 only 23 per cent.

REPORTER.	TOTAL CASES TREATED.			NON-OPERATED CASES.			OPERATED CASES.			PREVIOUS MORTALITY IN OPERATED CASES.	REMARKS.
	Cases.	Deaths.	Mortality, per cent.	Cases.	Deaths.	Mortality, per cent.	Cases.	Deaths.	Mortality, per cent.		
Crohn	150	5	3.3	144	4	2.7	6 T.	1 T.	16.6	....	During a severe epidemic; but the cases were treated early, the 5 deaths later.
Unterholzner	205	40	19.8	155	15	10.0	50 {43 I. 7 I. & T.	25 {19 I. 6 I. & T.	44.2 85.0 (50.0)	70.0	Of the 40 deaths, 9 were moribund on admission.
Blumenfeld	229	20	8.7	227	19	8.4	2 T.	1 T.	50.0	....	There were 60 laryngeal cases; the tracheotomy case was moribund on admission.
Zuppinger	160	40	25.0	121	25	20.7	39 {36 I. 2 T. 1 I. & T.	15 {14 I. 1 I. & T.	38.0 100.0 (38.4)	....	There were 9 cases moribund on admission, 4 of these laryngeal.
Neurath	200	37	17.0	159	11	6.7	41 I. or T.	23 I. or T.	56.0	69.2	Of the 100 cases last treated, 13 died. Deducting 5 moribund, the mortality was 8.4 per cent.
Crown Prince Rudolph Hospital	144	29	20.0	107	15	14.0	37 {34 I. 2 T. 1 I. & T.	14 {13 I. 1 I. & T.	38.2 100.0 (37.9)	....	Of 49 laryngeal cases, 13 died; of 3 croup cases *not injected*, all died.
Mazzotti & Bache	58	2	3.4	54	..	....	4 T.	2 T.	50.0	....	There were 13 croup cases; 4 operated on.
Revillod	62	4	6.4	50	1	2.0	12 I. or T.	3 I. or T.	25.0	....	These included 27 laryngeal cases.
Clubbe & Lichfield	100	23	23.0	52	5	10.0	48 T.	18 T.	39.5	67.7	In 100 cases treated without antitoxin, there were 59 T., with 39 deaths.
Wieland	109	28	25.7	..	..	....	109 I. or T.	28 I. or T.	25.7	55 to 59.0	Only operated cases were included in the statistics to compare the results.
Martyn	24	6	25.0	13	3	23.0	11 T.	3 T.	35.0	78.0	In 1894, without antitoxin, the mortality was 66 per cent.; in operated cases 78 per cent.
Steele	14	2	14.0	12	1	8.3	2 T.	1 T.	50.0	....	
Knöpfelmacher	100	21	21.0	91	17	18.8	9 T.	4 T.	44.4	....	Of the 21 fatal cases, 5 died within 24 hours after admission.
Middlesex Hospital	29	4	13.8	18	..	....	11 T.	4 T.	36.3	....	Of 5 cases treated without antitoxin at the same time, 2 (40 per cent.) died.
Marsh	179	25	14.0	148	15	10.0	31 {29 T. 2 I.	10 T. 0 I.	34.5	77 to 86.9	Of the 25 fatal cases, 8 died within 24 hours after admission.
Metropolitan Asylum Board	2,182	615	28.1	1,930	490	25.4	255 T.	125 T.	49.4	70.4	The number of laryngeal cases requiring operation fell from 56 per cent. in 1894 to 45.3 per cent. in 1895; the per cent. of mortality of cases operated on in 1894 and 1895 fell from 62 per cent. to 49.3 per cent. In 1894 no antitoxin was injected; in 1895 the severer cases only were injected.

American Pediatric Society....	3,384	450	13.0	2,819	312	11.3	565 { 533 I. 32 T. (9 I.& T.) }	138 I. 12 T. (7 I. & T.)	25.9 37.4	52.6 to 69.5	Deducting the moribund cases, or those dying within 24 hours after injection, the mortality was 9.12 per cent. for non-operative and 16.9 per cent. for operative cases.
Total of 72 reports..	15,148	2,626	16.6	12,066	1,491	13.5	3,082	1,135	36.7	70.0	20 per cent. of all cases required operation; formerly about 40 per cent.

SUMMARY.

In a total of 72 reports of 15,148 cases treated with antitoxin, with 2,626 deaths, or a mortality of 16.6 per cent., there were 12,066 non-operative cases, with 1,491 deaths, giving a mortality of 12.7 per cent., and 3,082 operative cases, with 1,135 deaths, or a case mortality of 36.7 per cent. Of the cases reported, therefore, 20 per cent. required operation, tracheotomy or intubation; formerly about 40 per cent. The previous mortality of operative cases, tracheotomy and intubation, was 70 per cent. on an average. Of the 3,082 operative cases, 1,355 were tracheotomized, with 569 deaths, giving a mortality of 42 per cent.; 1,173 were intubated, with 361 deaths, or a mortality of 30.8 per cent.; 52 cases were intubated with secondary tracheotomy, and of these 37 died, giving a mortality of 71 per cent.; 502 cases were tracheotomized or intubated (not stated which), with 168 deaths, or a mortality of 33.2 per cent.

The total mortality of operative cases, as shown in this table, was thus reduced also one-half as the result of the antitoxin treatment; while at the same time about half as many cases required operation as formerly.

TABLE XX.

Mortality of Cases Treated with Antitoxin, Arranged According to Age.

	TOTAL CASES TREATED.			0 TO 1 YEAR.		1 TO 2 YEARS.		2 TO 3 YEA'S.		3 TO 4 YEARS.		4 TO 5 YEARS.		5 TO 6 YEARS.		6 TO 7 YEARS.		7 TO 8 YEARS.		10 TO 15 YEARS AND OVER.	
	Cases.	Deaths.	Mortality, Per cent.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Kossel..................	117	13	11.0	3	1	4	0	18	2	14	3	20	3	10	2	11	0	37	2	..	..
Bokai..................	120	31	25.5	1	1	22	10	22	7	24	4	18	3	{ 5–10 yrs. 29	6 }	..	..	..	..	4	0
Borger..................	30	2	6.6	..	..	..	..	1	0	2	0	1	0	1	1	3	0	22	1	..	..
Seitz..................	27	1	3.6	1	0	4	0	2	1	6	0	4	0	4	0	1	0	5	0	..	..
Hager..................	25	1	4.0	1	0	1	0	1	0	3	0	6	1	4	0	9	0	..	..	..	..
Heim..................	27	6	22.0	..	..	5	1	4	1	2	0	6	2	3	0	2	0	5	2	..	..
Unterholzner..........	31	8	25.8	2	1	9	5	7	2	3	0	2	0	1	0	2	0	5	0	..	..
Schroeder..............	63	8	12.7	..	..	{ 0–2 yrs. 6	3	2–10 yrs 54	2 }	..	..	..	..	..	..	..	..	..	..	5	1
Fraser..................	95	22	23.1	4	2	9	3	6	1	16	6	10	3	{ 5–10 yrs. 23	9 }	..	..	..	..	31	3

REPORTER.	TOTAL CASES TREATED.			0 TO 1 YEAR.		1 TO 2 YEARS.		2 TO 3 YEARS.		3 TO 4 YEARS.		4 TO 5 YEARS.		5 TO 6 YEARS.		6 TO 7 YEARS.		7 TO 8 YEARS.		10 TO 15 YEARS AND OVER.	
	Cases.	Deaths.	Mortality, Per cent.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Goodall	72	14	19.4	4	1	10	2	7	1	9	3	10	5	5–10 22	yrs. 2	..	..	..	..	10	0
Hall	11	3	27.3	..	..	1	0	..	..	..	..	..	..	..	..	1	1	9	2	..	..
Weiderhofer	100	24	24.0	8	5	24	9	20	7	14	0	16	3	5	0	7	0	6	0	..	..
Epidemic in Trieste	105	27	25.7	9	5	12	5	12	6	15	3	16	5	13	1	7	0	21	2	..	..
Blumenfeld	50	2	4.0	..	..	6	1	5	0	..	..	5	0	5	0	14	0	15	1	..	..
Rapmund	100	7	7.0	1	0	6	1	12	2	3–5 22	yrs. 1	..	..	5–10 43	yrs. 3	..	..	..	..	16	0
Schaewen	15	0	0.0	1	0	1	0	..	..	1	0	1	0	2	0	..	..	10	0	..	..
v. Muralt	58	2	3.4	..	..	..	..	1–3 21	yrs. 1	Over 3 37	yrs. 1	..	..	..	..	..	..	..	..	..	..
Codd & Whitehouse	11	4	36.4	1	0	..	..	1	1	..	..	1	1	1	0	1	0	6	2	..	..
Winkfield	22	4	18.2	..	..	1	1	2	1	4	0	2	1	3	1	2	0	8	0	..	..
Van Nes	52	12	23.0	..	..	1	0	7	4	4	2	9	4	8	0	7	0	16	2	..	..
Lichtenstern & Wendelstadt	123	25	20.3	..	..	0–2 30	yrs. 11	2–4 32	yrs. 6	..	..	Over 4 61	yrs. 8	..	..	..	..	..	..	..	..
Baginsky	525	83	15.6	..	..	0–2 87	yrs. 22	2–4 146	yrs. 25	..	..	4–6 116	yrs 20	..	..	6–8 79	yrs. 9	..	..	93	7
v. Ranke	163	29	17.7	5	5	24	9	25	3	32	4	17	2	20	2	39	3	..	..	..	..
Soltmann	181	44	24.3	3	2	25	15	30	6	31	6	27	6	12	4	16	2	37	3	..	..
Adolph	100	20	20.0	2	1	14	5	7	2	18	6	10	1	6	1	7	0	36	4	..	..
British Medical Journal	334	74	22.1	18	9	61	20	47	12	43	6	49	14	5–10 81	yrs. 11	..	..	..	..	35	2
Aaser	212	21	9.9	9	2	8	4	22	4	21	0	24	3	5–10 69	yrs. 6	..	..	..	..	59	3
Virneisel	150	19	12.7	7	2	1–5 98	yrs. 14	..	..	..	..	..	..	..	..	6–10 25	yrs. 3	..	..	20	0
Fürth	150	23	15.3	0–2 19	yrs. 3	..	..	2–6 75	yrs. 18	..	..	..	..	..	..	6–10 31	yrs. 1	..	..	25	1
Blumenfeld	229	20	8.7	7	1	23	5	54	6	3–5 43	yrs. 5	..	..	5–10 67	yrs. 3	..	..	..	..	35	0
Ssamgin	314	61	18.4	..	..	..	..	0–5 134	yrs. 38	..	..	..	..	5–10 80	yrs. 18	..	..	..	..	100	5
Zuppinger	160	40	25.0	13	9	32	12	..	..	57	10	4–6 32	yrs. 6	..	..	6 & 26	ov'r 3	..	..	..	..
Olemikow	166	39	22.3	0–2 22	yrs. 8	..	..	2–4 47	yrs. 13	..	..	4–6 40	yrs. 11	..	..	..	..	7–10 33	yrs. 2	24	3
Knöpfelmacher	100	21	21.0	0–2 25	yrs. 10	..	..	16	6	12	3	10	2	7	0	8	0	8	0	14	0
Marsh	179	25	14.0	7	3	23	9	26	2	16	4	16	4	5–10 40	yrs. 2	..	..	..	..	18	2

Janowski	32	3	9.3	5	2	7	1	2	0	5	0	..	..	2	0	6 & 11	ov'r 0	..	..	..	..
Met. Asyl. Board	2,182	615	28.1	37	18	182	94	187	65	310	104	297	98	5–10 816	yrs. 196	..	..	..	..	353	40
Americ. Ped. Soc.	3,384	450	13.0	0–2 631	yrs. 137	..	..	2–5 1,276	yrs. 175	..	..	..	..	5–10 883	yrs. 108	..	..	..	..	602	32
Total in 38 reports.	9,800	1,803	18.4																		

This table shows, in a total of 9,800 cases, with 1,803 deaths, or a mortality of 18.4 per cent., from hospital and private practice, the following results, according to age: Under 2 years of age there were 1,494 cases, with 469 deaths, or a mortality of 31.4 per cent.; from 2 to 5 years of age there were 3,678 cases, with 762 deaths, or a mortality of 20.7 per cent.; from 5 to 10 years of age there were 3,184 cases, with 473 deaths, or a mortality of 14.8 per cent.; over 10 years of age there were 1,444 cases, with 99 deaths, or a mortality of 6.9 per cent.

These reports are taken largely from hospital cases.

TABLE XXI.

Mortality of Cases Treated with Antitoxin, Arranged According to the Day of Disease on which Treatment was Begun.

REPORTER.	TOTAL CASES TREATED.			1ST DAY OF DISEASE.		2D DAY OF DISEASE.		3D DAY OF DISEASE.		4TH DAY OF DISEASE.		5TH DAY OF DISEASE AND LATER		DAY UNKNOWN.		REMARKS.
	Cases.	Deaths.	Mortality, Per Cent.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	
Kossel	117	13	11.1	14	0	30	1	29	0	9	1	29	10	6	1	Mortality for first 3 days, 1.4 per cent.
Ganghofner	110	14	12.7	3	0	30	2	35	3	18	4	24	5	..	..	
Schroeder	63	8	12.7	..	..	1st to 2d 23	day 1	..	..	3d to 4th 27	day. 3	13	4	..	..	
Vierordt	55	8	14.6	3	0	14	1	17	2	9	0	12	4	..	..	
Rumpf	26	2	8.0	..	..	18	1	3	1	5	0	..	..	..	..	
Börger	30	2	6.6	3	0	13	0	9	0	..	..	5	2	..	..	
Hager (private practice)	25	1	4.0	14	1	5	0	4	0	1	0	1	0	..	..	1 death on first day due to complications.
Heim	27	6	22.0	..	..	9	0	2	1	7	1	9	4	..	..	
Kuntzen	25	3	12.0	3	0	6	0	7	1	2	0	7	2	..	..	
Epidemic in Trieste (hospital)...	105	27	25.7	6	0	30	5	29	9	20	5	20	8	..	..	
——— (private practice)...	72	5	6.9	14	0	27	2	18	1	8	2	5	0	..	..	
Blumenfeld (private practice)....	50	2	4.0	..	..	1st to 2d 40	day 0	..	..	3d to 4th 8	day. 1	2	1	..	..	
Rapmund (private practice)......	100	7	7.0	..	..	1st to 2d 73	day 2	..	..	3d to 4th 20	day. 3	7	2	..	..	
Schaewen (private practice)......	15	0	0.0	6	0	3	0	..	..	..	..	6	0	..	..	
Risel (hospital and private practice)	114	9	7.9	..	..	78	4	21	4	4	0	11	1	..	..	89 in hospital; 25 in families.
v. Muralt (private practice).......	58	2	3.4	11	0	18	0	17	0	12	2	..	..	..	..	

REPORTER.	TOTAL CASES TREATED.			1ST DAY OF DISEASE.		2D DAY OF DISEASE.		3D DAY OF DISEASE.		4TH DAY OF DISEASE.		5TH DAY OF DISEASE AND LATER		DAY UNKNOWN.		REMARKS.
	Cases.	Deaths.	Mortality, Per Cent.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	
Codd & Whitehouse	11	4	36.4	1	0	2	0	5	2	..	..	3	2	..	..	
Howard (private practice)	40	3	7.5	24	0	7	0	2	0	2	1	5	2	..	..	
Baginsky	525	83	15.6	111	3	134	14	92	13	52	12	81	30	55	11	3 deaths reported first day were far advanced on admission to hospital.
Vucetig (private practice)	30	2	6.6	13	0	8	0	5	0	1	0	3	2	..	..	
Van Nes	52	12	23.0	2	1	13	1	10	1	7	2	20	7	..	..	
Kurth	97	10	10.3	12	0	35	2	16	1	19	3	15	4	..	..	
Von Ranke	163	29	17.7	19	1	47	4	37	7	19	3	34	12	7	2	
Soltmann	181	44	24.3	7	0	25	1	22	2	44	14	55	17	28	10	
Adolph	100	20	20.0	10	0	20	1	27	4	21	7	16	8	..	..	
Seitz (private practice)	140	12	8.5	95	0	23	2	6	2	15	7	1	1	..	..	
Aaser	212	21	9.9	15	0	102	1	43	5	22	4	30	11	..	..	
Chicago Health Board	1,468	94	6.4	106	0	336	5	660	18	269	38	97	33	..	..	
Virneisel	150	19	12.7	22	0	50	5	15	1	15	1	20	7	28	5	Mortality up to third day, 6.9 per cent.; after third day, 20.5 per cent.
Zuppinger	160	40	25.0	29	3	32	5	35	10	....	..	54	17	..	..	9 cases were moribund on admission.
Clessin (private practice)	22	0	0.0	5	0	9	0	4	0	....	..	3	0	..	..	
Ssamgin	314	61	18.4	1	0	67	7	75	11	106	19	66	24	..	..	
Marsh	179	25	14.0	10	0	11	0	20	4	23	6	83	15	..	..	
Janowski	32	3	9.3	10	0	7	0	8	1	3	1	4	1	..	..	
Metropolitan Asylum Board	2,182	615	28.1	86	4	403	60	449	118	453	150	791	283	..	..	Only severe cases were injected.
American Ped. Society	3,384	450	13.0	764	38	1,065	89	620	79	336	77	390	152	215	15	Those dying within 24 hours after injection are included.
Total	10,425	1,672	16.0													

This table shows, in a total of 10,425 cases, with 1,672 deaths, or a mortality of 16 per cent., that on the first and second days of disease there were injected 4,232 cases, with 267 deaths, giving a mortality of 6.3 per cent.; on the third and fourth days there were 3,870 cases, with 656 deaths, or a mortality of 17.2 per cent.; after the fourth day there were 1,984 cases, with a mortality of 34.6 per cent.; of 339 cases injected, in which the day of disease was unknown, 44 died, or 13 per cent.

Or, in 9,765 cases, with a mortality of 16.1 per cent., in which the days of disease on which treatment was commenced is more specifically mentioned, there were injected on the first day 1,415 cases, with 51 deaths, giving a mortality of 3.5 per cent.; on the second day, 2,640 cases, with 213 deaths, or 8 per cent. mortality (making again for the first two days a mortality of 6.4 per cent.); on the third day, 2,340 cases, with 300 deaths, or a mortality of 12.8 per cent.; on the fourth day, 1,458 cases, with 346 deaths, or 23.6 per cent.; on the fifth day and after, 1,912 cases, with 671 deaths, giving a mortality of 35 per cent.

TABLE XXII.

Immunization by Antitoxin. Number of Cases Immunized; Number of Antitoxin Units Injected; Number of Persons Immunizea Attacked, within 30 Days and after 30 Days.

REPORTER.	NUMBER OF CASES IMMUNIZED.	NUMBER OF ANTITOXIN UNITS INJECTED.	NUMBER OF THOSE IMMUNIZED ATTACKED WITHIN 30 DAYS.	NUMBER OF THOSE IMMUNIZED ATTACKED AFTER 30 DAYS.	REMARKS.
Roux	128	1,000	....	....	Of the 428 cases admitted to the "Hopital des Enfants Malades," 128 patients did not show the Klebs-Loeffler bacillus on bacteriological examination; but all were injected with the full dose immediately on entrance. None of the 128, though exposed to the disease, were attacked later, and no ill effects followed injection.
Moizard and Peregaux	53	500 to 1,000	....	....	Of 302 children admitted to the "Hopital Trousseau" 53 were non-diphtheritic, but all received the initial injection of 10 to 20 c. cm. None of the 53 contracted the disease later, though exposed to infection, and no serious effects were observed to follow the injection, though the full curative dose was given.
Heubner	64	50 to 60	2 mild	....	
Baginsky	150	50 to 100	2 mild	....	In the "Kaiser and Kaiserin Friedrich Krankenhaus," exposed to infection.
Wiederhofer	130*	50 to 150	2 mild	....	
	300†		2 mild	....	
	188‡		1 mild	....	
Hager	35	50 to 60	4 mild	....	In families exposed to disease. The doses given at first were insufficient; none injected later were attacked.
Seitz	8	100	....	....	During an epidemic of diphtheria in Heligoland.
Wick	10	50 to 100	2 mild	....	In families in Strassburg. The doses given at first were insufficient and repeated.
Hilbert	64	50 to 60	7 mild	....	In 25 families in Königsberg. The doses were repeated.
Schaewen	18	50 to 60	....	....	
Handler	35	50 to 60	....	2 mild	These injections were made during an epidemic in Austro-Hungary in families living on farms where isolation was impossible, one child sleeping in the same bed with another ill with diphtheria, and 9 others in 2 families occupying the same room and exposed to infection.
Epidemic in Trieste and surrounding districts	67	50 to 60	12 mild	1 fatal	This epidemic raged for several months. 15 of those immunized were exposed to infection 7 to 18 days before injection, one of whom died after 30 days, having received an insufficient dose, as reported.
Schüler	89	50 to 100	1 mild	....	In a girls' protectory in Berlin, 12 out of 65 inmates, between 6 and 14 years of age, contracted diphtheria. The other 53 were immediately immunized. No isolation was attempted; 36 other children, in 29 families, were also immunized successfully.
Risel	57	50 to 60	1 mild on 6th day	....	These experiments with antitoxin were made by a club of 30 physicians in Halle; 114 cases of diphtheria were treated at the same time, 89 in families and 25 in hospital.

* At home. † Hospital. ‡ Country.

REPORTER.	NUMBER OF CASES IMMUNIZED.	NUMBER OF ANTITOXIN UNITS INJECTED.	NUMBER OF THOSE IMMUNIZED ATTACKED WITHIN 30 DAYS.	NUMBER OF THOSE IMMUNIZED ATTACKED AFTER 30 DAYS.	REMARKS.
Zabulatnui	228	60 to 100	...	...	In private practice in Podolia, Russia.
Torday	494	50 to 60	3 mild	...	During an epidemic in Buda-Pesth.
Governor of Croatia and Slavonica.	826	50 to 60	16 mild; 1 fatal	...	5 of these contracted the disease within 8 days. Wien. Klin. Woch., No. 7, 1895.
Richter	62	50 to 60	7 mild	...	These cases were immunized in Marienberg.
Behring	10,000	60	10 mild	...	Reported in the Deutsche Med. Wochenschrift, November 15, 1894. These cases were injected where diphtheria was epidemic.
Morill	438	50 to 200	3 mild on 9th and 10th days	...	Successive epidemics in the Boston City Hospital had necessitated the closing of the hospital three times in one year, 1894. On this occasion it was decided to give every patient admitted an immunizing dose of antitoxin, with the result that only 3 mild cases occurred after injection, and the epidemic was controlled.
Rosenthal	276	150 to 500	1 mild after 3 weeks	...	64 adults and 212 children. Of the 276 cases, 201 showed the bacilli or other evidence that was suspicious.
Seibert	36	200	...	...	
New York Infant Asylum, 1st.	224	100 to 200	1 mild on 19th day.	6	107 cases of diphtheria occurred before the first immunization, in 108 days.
New York Infant Asylum, 2d	245	125 to 225	1 mild on 12th day	4	6 cases occurred before the second immunization in 12 days.
Nursery and Childs' Hospital, N. Y.	136	50 to 200	...	...	46 cases of diphtheria occurred in 90 days; 15 cases occurred in 15 days before immunization.
N. Y. Juvenile Asylum	81	150 to 250	...	...	12 cases of diphtheria; 3 cases in 2 days previously.
New York Catholic Protectory	114	150 to 600	...	...	There were 5 cases of diphtheria in 3 days previous to immunization.
Bellevue Hospital	11	175 to 225	1 mild within 24 hours	...	2 cases of diphtheria had occurred previous to immunization.
Chicago Health Board	1,423	150 to 200	9 mild.	...	By Health Department Inspectors in asylums, kindergartens, and in families exposed to disease.
Crohn	300	150 to 200	...	§7 mild.	During a severe epidemic in Halberstadt, the severest in 15 years, according to the report.
Paltauf	318	150 to 200	20 mild	...	Vienna Collective Investigation, up to April, 1896.
Zuppinger	29	...	1 mild.	...	Kronprinz Rudolf Spital., Wien. Klin. Wochshft., 1896, No. 22.
Thuróczy	133	150 to 250	5 mild.	...	
Löhr	460	150 to 1,000.	5 mild after 21 days	...	Jahrbuch f. Kind. heilkunde, 1896, vol. 43.
Morill	290	150 to 200	...	1 mild.	Results of immunization, December to April, 1896, in the Boston Hospital. Bost. Med. Surg. Jour., May, 1896.
	17,516	50 to 1,000	109 mild; 1 fatal	20 mild; 1 fatal.	No serious after effects were observed in any case which could be ascribed to the injection given.

§ 3 after 30 days; 4 after 6 weeks.

According to thirty-five published reports, recorded in this table, there are 17,516 persons, children and adults, to whom immunizing injections of antitoxin have been administered, with the result that, though exposed to the disease, only 129 were mildly attacked later (109 within 30 days and 20 after 30 days), and two only died of the disease, one within and the other after a month. 17,375 individuals were completely immunized and did not contract the disease within 30 days.

NEW YORK, November 19, 1896.

CHAS. S. BENEDICT, M. D.,
Chief Inspector :

SIR—I have the honor to submit the following report of an investigation as to the extent of the spread of contagious diseases through schools. In the beginning, all the cases of scarlet fever and diphtheria reported during the first four weeks of October in two different sections of the city were visited. The districts chosen were :

" A," Houston to Fourteenth street, east of Broadway.

" B," Twenty-sixth to Forty-second street, west of Seventh avenue.

This gave a considerable number of cases, but it was soon found that little accurate information could be obtained either from the families or from schools, unless the case is recent. The best results have been obtained by securing the absence list of a class in which a contagious disease has occurred, and then visiting those children to find the cause of such absence. The result of the preliminary work may be stated as follows :

	SCARLET FEVER.			DIPHTHERIA.		
	District " A."	District " B."	Total.	District " A."	District " B."	Total.
Families with no school children	4	6	10	11	7	18
Families with school children not sick	2	4	6	8	9	17
Families with first case a school child	13	2	15	11	8	19
Total	19	12	31	30	24	54

In all, eighty-five families with scarlet fever or diphtheria were visited, and it is to be understood that no reference is made to any but primary cases in each family.

The only noticeable difference in the figures of the two districts is the increased number of school children with scarlet fever in District " A," and it was here that the connection with the schools was best marked.

Taking the totals it is seen that one-third of the families both with scarlet fever and diphtheria have no school children, and this is probably a fair average when these diseases are only ordinarily prevalent. Any unusual or severe outbreak has always come from schools, in my experience.

In the families with school children it is noticeable how much oftener the first cases of scarlet fever appear in a school child than the first case of diphtheria apparently does. If the number of cases is sufficiently large to draw conclusions from, this appears to indicate either that the infection of diphtheria is more easily conveyed by well children or that many cases of diphtheria are unnoticed. The latter is probably correct, as I have repeatedly found before. For example, in one case a baby was reported dead from diphtheria and her brother was found to attend a class in which diphtheria cases were occurring. This child had been sent away to prevent his contracting the disease, but as there was a history that he had just had a bad "cold," he was examined, when membrane was found to be still present and the culture showed Loeffler bacilli. This child also infected another in an adjoining apartment at the same time as he did his sister.

At another time diphtheria was found to be prevalent in a class, and the cause not known until a "croup" case was reported in a baby. It was then found that the baby's brother had been treated at a dispensary about ten days before for tonsilitis and had soon returned to school, and was then attending the class in which cases of diphtheria were developing. Culture of this case showed Loeffler bacilli, and the child had undoubtedly had diphtheria.

At another time, when diphtheria began to occur in a girls' class and the absence list was investigated, two children were found dying of diphtheria. It was found that their sister in this class had been sick with a "sore throat" and returned to school, and the other cases followed in her class and in her family. This child showed Loeffler bacilli. Another child from this class in a different family had been sent home sick by a teacher. On visiting this family, a baby was found suffering with "croup," but the school girl had been sent away to prevent her from contracting the disease. When this child was found, however, there was still membrane on the tonsils, and the culture showed Loeffler bacilli present.

Such unnoticed cases are by no means infrequent, and it is found often that the child has been sent home by the teachers, but returns, of course, when feeling well. This also happens with scarlet fever. Last spring a child with scarlet fever told me a boy in his class could peel the skin off his hands. This statement was strictly true, and other cases of scarlet fever followed in his class. On visiting another case of scarlet fever, it was said that a boy on the same floor had scarlet fever two weeks before, and on visiting the school he was found to be desquamating from scarlet fever and removed from school, but several cases followed.

During this investigation, a child was found playing in the street, and desquamating profusely, and living in a butcher shop. He was preparing to return to school, and had already infected a child in another family in the house.

In regard to measles, seventeen cases reported during three weeks of October, between Houston and Fifty-ninth streets, east of Third avenue, were investigated and, in addition, twenty more families were found where the cases had not been reported, nine of these having never called a physician.

These cases were contracted as follows:

In a parochial school	13	In another infected house	1
In a public school	2	From previous cases in house	8
In an institution	1	From unknown sources (all infants)	5
In a kindergarten	3		
In a kindergarten	4	Total	37

The kindergarten cases were apparently the last of the epidemic. In the public school one case occurred ten days after the other in the same class. The cases in a parochial school were mostly from the infant class, he sister of one of these children, who was sick, attended another until the day before the measles rash developed, and started the se in this class also. The child who contracted the disease from her in in an infected house attended a kindergarten in a public school the day before the measles rash developed, and has undoubtedly ed an epidemic there. Of the thirteen cases in the parochial school, hree were known to those in charge.

easles is undoubtedly most often brought into a house from the ols, and then usually spreads through the house. Owing to its great giousness, several cases usually appear together, and it is very easily d, and I believe that scarlet fever and diphtheria are also largely d by means of the schools, and that by taking cases early, and folg each case up carefully, the connection might be found. To see if s so, recent cases in District "A" were taken, and when a child with et fever has been known to be from any class, all the children absent this class have been visited, and this has been continued until at least veek from the development of the last known case. In not a few cases ddress obtained from the school has been incorrect, and in spite of effort the absent child could not be found. For this reason it is ble that some cases of scarlet fever have not been discovered.

he following is a statement of all the known cases of scarlet fever fall in school children attending Grammar School No. 25, No. 330 street, and, with one exception, these cases have been in the Primary rtment :

NAME.	FIRST DAY OF SICKNESS.	LAST DAY AT SCHOOL.	NUMBER OF CLASS.	PHYSICIAN ATTENDING.	CASE REPORTED.	CASE FOUND.
M.	Sept. 28	Sept. 25	Miss C.	....	Oct. 14	....
S.	Oct. 2	....	11 boys.	Yes.	" 5	....
S.	" 12	Oct. 9	C. No. 2.	Yes.	" 15	....
K.	" 12	Nov. 2	12 boys.	No.	No.	Nov. 2
F.	" 17	Oct. 15	Miss M.	Yes.	No.	" 2
N.	" 18	" 19	11 boys.	Yes.	No.	" 5
L.	" 19	" 19	Miss M.	Yes.	Oct. 23	....
.K.	" 22	" 21	11 girls.	No.	No.	Nov. 2
E.	" 24	" 23 (?)	12 boys.	Yes.	Oct. 28	....
W.	" 25	" 23 (?)	12 boys.	Yes.	" 28	....
H.	" 25	" 23 (?)	12 boys.	Yes.	No.	Oct. 29
B.	" 25	" 23 (?)	12 boys.	No.	No.	" 29
M.	" 25 (?)	" 26	11 girls.	No.	No.	Nov. 7
T.	" 26	" 26	11 boys.	Yes.	Nov. 2	....
Z.	" 30	" 30	12 boys.	No.	No.	Nov. 2
R.	Nov. 2	Nov. 2	11 boys.	Yes.	No.	" 5
G.	" 2	" 2	11 girls.	Yes.	No.	" 7
B.	" 5	" 6 (?)	12 boys.	Yes.	No.	" 7
W.	" 5	" 5	12 boys.	No.	No.	" 7
N.	" 5	" 2	11 girls.	Yes.	No.	" 7

o case has been found developing since November 5, and the epic has probably ceased. The dates of the first day of sickness and lay at school are obtained from the parents and from the school, ctively, and in the several cases where there is a marked disagreein dates, I have indicated by the mark (?) the date which I consider to be incorrect. A few of the children were sent from school sick. Cases 16, 17 and 20 were reported on the morning following my visit, but Case 20 is the only one that might possibly have been otherwise reported. Excluding Case 20 and including Case 10 (see note) there were thirteen cases that would probably have remained unknown to this Department if the absence list had not been investigated. Of these thirteen cases, four did return to school and would have remained in a contagious condition if they had not been found, and several others were preparing to return. The epidemic would certainly have been indefinitely prolonged in the absence of some such investigation.

A few of the cases are especially interesting.

Case 1—No physician was called in this case until a younger brother was also taken sick, and the physician, finding the first child desquamating, promptly reported the case. While this child was desquamating an older sister attended school in the class with Case 4, sitting next to her, and undoubtedly so conveyed the contagion to her.

Case 3—The mother thought the child had measles and called no physician, but later took the child to see a physician in a drug-store. He observed the desquamation, but nevertheless had the child brought to the store for treatment, although when he was told that the child had returned to school on November 2, he advised against this.

Case 5—Although this child appears to have been quite ill, no physician was called, and he returned to school October 15 and attended until November 2, when he was found in the class-room desquamating. It was in this class that most cases occurred. He was a brother of Case 6, who had returned to school November 2, the day her brother was found to have scarlet fever.

Case 6—This case was found when investigating the absence of her brother from the 12th Boys' class. Her brother was not sick and attended school until October 30, when the mother and a younger child had also contracted the disease in a severe form.

Case 10—Was reported, but as measles, and child tried to return to school while desquamating.

Case 13—This child was just beginning to desquamate when found, and her three brothers were attending school.

Case 17—Three sisters of this child were attending school, although she was undoubtedly known to have scarlet fever. In March, 1894, a concealed case of diphtheria was found in this family by the same means. The same physician was then in attendance.

Case 19—This child was found living in apartments where dressmaking is done, and his sister was attending school.

Some other instances of the way the disease may be spread were also noticed.

In visiting a boy in Class 17, although he was well, his sister was found to have scarlet fever, the same not being reported. This child attended the Olivet Kindergarten on Second street, and on investigating the absence here, two children in one family were found with the following history: They were taken sick within a day of each other, and the physician called said they had hives, although he evidently suspected (if he did not know) what they really had. When visited, there was no way of determining whether the children had scarlet fever, and although they were considered suspicious, nothing could be done. On visiting them five days later, it was found that on the previous day the children had been taken to the dispensary of Roosevelt Hospital, from No. 87 Second street, and desquamation being then found, the cases were reported to this Department.

There was twelve days difference in the date of the development of the two cases in this kindergarten, and no other cases could be found. It seems more probable that the child was infected by her brother, as there was a boy in his class desqumating, than that there should have been such a long incubation.

In investigating the absence list of a class in Grammar School No. 19, at No. 344 East Fourteenth street, a child was found who appeared to be desquamating, although it was not characteristic enough to be sure of, and there was no history of any sickness. Her younger brother, however, had well marked scarlet fever. This case was reported, but as diphtheria, with a request that a culture be not taken. Such a case might easily be overlooked in the absence of known reason for suspicion.

In the Primary Department of the school at Ninth street and First avenue, several cases were found and are reported below, being all the known cases in this school this fall :

No.	NAME.	FIRST DAY OF SICKNESS.	LAST DAY AT SCHOOL.	NO. OF CLASS.	PHYSICIAN ATTENDING.	CASE REPORTED.	CASE FOUND.
1	L. M	Oct. 15	Oct. 15	E. 1	Yes	No	Nov. 16
2	R. A	" 20	" 15	F. 6	Yes	No	" 16
3	A. R	" 26 (?)	" 26	5 Boys'	Yes	Nov. 2	....
4	E. D	Nov. 3 (?)	Nov. 2	E. 1	Yes	No	Nov. 16
5	P. M	" 5 (?)	" 6	F. 2	Yes	Nov. 9	....
6	S. S	" 6	" 6	E. 1	Yes	" 12	....
7	M. M	" 9	" 9	E. 1	Yes	" 9	....
8	H. K	" 10	" 10	F. 6	Yes	" 12	....
*9	E. G	" 10	" 10	1	No	No	Nov. 14
10	A. S	" 12	....	F. 6	Yes	No	" 21
11	C. E	" 13	Nov. 12	E. 1	No	No	" 17
12	N. M	" 16	....	F. 6	Yes	Nov. 28	....

* By District Inspector on citizen's complaint.

Of these cases, it may be noted that in Case 1 a brother was sent away in the beginning, but allowed to return while the sick child was desquamating, and during the whole time attended school.

Case 2—This child attended school from October 27 to 30, inclusive, and then, developing nephritis, ceased attending. She must have been desquamating these four days.

Case 7—Is a sister of Case 5, and attended school until she sickened in school and was sent home.

Case 10—This child was found with a well marked, but not severe, case of scarlet fever, playing in the yard with other children.

Two other suspicious cases were found, but in a condition in which no diagnosis can at present be made. It is probable that some other cases may yet develop in this school.

Respectfully submitted,

GEORGE S. LYNDE, M. D.,
Medical Inspector.

NEW YORK, January 4, 1897.

To the Secretary of the Board of Health of the Health Department of the City of New York:

SIR—I herewith forward the report of Medical Inspector Moreau Morris, M. D., in regard to the care of contagious diseases in the Incorporated Institutions of New York City.

Very respectfully,

CHARLES F. ROBERTS, M. D.,
Sanitary Superintendent.

DR. CHARLES S. BENEDICT,
Chief Inspector :

SIR—I have the honor to present the following report upon the incorporated institutions of New York City, receiving or caring for children, with a résumé of their conditions from 1886 to 1896, inclusive.

During the year 1885 the attention of the New York Academy of Medicine was called to the alarming conditions prevailing in the charitable institutions of the city and residential schools with reference to contagious ophthalmia and other unsanitary conditions prevailing therein.

A committee of the Academy was appointed to investigate and report upon the facts, consisting of Drs. C. R. Agnew, C. S. Bull, D. Webster, G. M. Smith, R. H. Derby and A. Jacobi.

With a view to studying the conditions under which the dependent children of this great city were maintained, the committee secured the services of several well-recognized ophthalmic surgeons to assist in the investigations with them, and also requested a detail of sanitary inspectors from the Board of Health for their co-operation, in order that both the study of the conditions of the eyes of all inmates of these asylums and of the sanitary conditions of the institutions might be reported upon.

Upon the completion of these investigations, reports were forwarded to the committee, showing a large percentage of eye diseases in these asylums, and many unsanitary conditions pertaining thereto. More than fifty asylums in the city and vicinity were carefully investigated.

Resulting from this investigation a brief report was made to the Legislature during the session of 1885 and 1886, suggesting an act, entitled "For the better preservation of the health of children in institutions." This Act was passed by the Legislature on June 14, 1886, to take effect on the first day of October, 1886, and became chapter 633 of the laws of that year.

An amended act was passed in 1893, chapter 661, sections 203, 204, 205, 206, entitled, "An Act. Examination and Quarantine of Children Admitted to Institutions for Orphans, Destitute or Vagrant Children or Juvenile Delinquents." This act (practically similar to the former act) is now in force, and is as follows:

PASSED 1893.

CHAPTER 661, SECTIONS 203, 204, 205, 206.

AN ACT. Examination and Quarantine of Children Admitted to Institutions for Orphans, Destitute or Vagrant Children or Juvenile Delinquents.

Sec. 203. Every institution in this state, incorporated for the express purpose of receiving or caring for orphan, vagrant or destitute children or juvenile delinquents, except hospitals, shall have attached thereto a regular physician of its selection duly licensed under the laws of the State and in good professional standing, whose name and address shall be kept posted conspicuously within such institution near its main entrance.

The words "juvenile delinquents" here used shall include all children whose commitment to an institution is authorized by the penal code. The officer of every such institution, upon receiving a child therein, by commitment or otherwise, shall, before admitting it to contact with the other inmates, cause it to be examined by such physician, and a written certificate to be given by him, stating whether the child has diphtheria, scarlet fever, measles, whooping cough, or any other contagious or infectious disease, especially of the eyes and skin, which might be communicated to other inmates, and specifying the physical and mental condition of the child, the presence of any indication of hereditary or other constitutional disease, any deformity or abnormal condition found upon the examination to exist. No child shall be so admitted until such certificate shall have been furnished, which shall be filed with the commitment or other papers on record in the case, by the officers of the institution, who shall, on receiving such child, place it in strict quarantine thereafter from the other inmates, until discharged from such quarantine by such physician, who shall thereupon indorse upon the certificate the length of quarantine and the date of discharge therefrom.

Monthly Examination of Inmates and Reports.

Sec. 204. Such physician shall, at least once a month, thoroughly examine and inspect the entire institution and report, in writing, in such form as may be approved by the state board of health, to the board of managers or directors of the institution, and to the local board of the district or place where the institution is situated, its condition as to its plumbing, sinks, water-closets, urinals, privies, dormitories, the physical condition of the children, the existence of any contagious or infectious disease, particularly of the eyes or skin, their food, clothing and cleanliness, and whether the officers of the institution have provided proper and sufficient nurses, orderlies and other attendants of proper capacity to attend to such children, to secure to them due and proper care and attention as to their personal cleanliness and health, with such recommendations for the improvement thereof as he may deem proper. Such Board of Health shall immediately investigate any complaint against the management of the institution or of the existence of anything therein dangerous to life or health, and, if proven to be well founded, shall cause the evil to be remedied without delay.

Beds—Ventilation.

Sec. 205. The beds in every dormitory in such institution shall be separated by a passageway of not less than two feet in width, and so arranged that under each the air shall freely circulate, and there shall be adequate ventilation of each bed, and such dormitory shall be furnished with such means of ventilation as the local board of health shall prescribe.

In every dormitory six hundred cubic feet of air space shall be provided and allowed for each bed or occupant, and no more beds or occupants shall be permitted than are thus provided for, unless free and adequate means of ventilation exist, approved by the local board of health, and a special permit in writing therefor be granted by such board, specifying the number of beds or cubic air space which shall, under special circumstances, be allowed, which permit shall be kept conspicuously posted in such dormitory. The physician of the institution shall immediately notify, in writing, the local board of health and the board of managers or directors of the institution of any violation of any provision of this section.

* * * * * * * * * * * *

Any person who shall willfully refuse to comply with or to discharge any duty imposed by this act, or who shall violate any provision thereof, shall be guilty of a misdemeanor.

This act shall take effect immediately.

In the preliminary report of the Committee occurs the following clearly defined description of contagious ophthalmia: "Contagious ophthalmia is characterized by an inflammation of the lining membrane of the eyelids, and a subsequent extension of the diseased process to the eye itself. From the parts affected there is a secretion and this secretion is contagious. The secretion may be conveyed to healthy eyes by the water used in washing, by the towel or handkerchief, or even the air itself may be the bearer of the contagion. One peculiarity of the disease is that it may exist for months, and even years, in eyes, which to the lay attendant, and even by the patient afflicted with it, have been thought to be perfectly healthy. In the case of many, after the disease has for a varying length of time been confined to the eyelids, the transparent cornea, or watch-glass covering of the pupil, becomes affected. The sight soon is dimmed, ulceration or erosion of this membrane occurs, and, as a result, vision is either permanently damaged or completely lost." Also the following statement: "Of the dependent children cared for in the asylums of New York City, investigation has shown that one out of every four has contagious eye diseases. It by no means follows that all institutions show so large a percentage of disease as this. There are asylums where none or very few cases were found. There are, on the other hand, asylums in which more than half of the inmates have to-day (1885) eye diseases of a very severe and dangerous type, and where, as the ophthalmic expert says, 'it is a marvel to me that there is a healthy eye in the establishment' (Report on St. Joseph's Asylum). The reports already received show many cases where one eye has been seriously injured, and many where the sight of both eyes has become permanently impaired."

During this exhaustive investigation the following conditions were found to be almost universal:

There was no preliminary medical examination of children before admission to the asylums, especially with reference to eye diseases, and even those examined and admitted were not quarantined. In many of the institutions, whether committed by the courts or brought by their guardians, "children were received by the non-medical attendants in charge, without any medical examination, placed with other children in crowded dormitories, washed in the same lavatory with impure water, and using towels already impregnated, for days in succession."

"Unsanitary conditions of the plumbing, sinks, water-closets, urinals, privies and dormitories largely prevailed.

"The dietary was not carefully supervised, being found often insufficient in both quantity and quality. Lavatory accommodations of the poorest kind, water collected from bath-tubs and carried to the dormitories, where the children washed in basins, with one or two towels for 18 or 20 children, some beds with only one sheet, and this in many cases very dirty, towels collected after use and dried without being washed, and oftentimes distributed to others the same day. In one institution 35 roller towels were allowed daily for 650 boys. Dormitories were overcrowded, double-bedded, in many instances with less than 100 cubic feet of air space per bed."

Resulting from these neglected and unsanitary conditions, Mr. William B. Wait, Superintendent of the Blind Asylum of this city, reported, under date January 27, 1886: "An examination for a few years back of children admitted to the Blind Asylum gives the following results: 39 blind children from institutions had been received. Subsequent inquiry from the same source shows that since the law of 1886 took effect, he has been unable to trace any new admissions directly from institutions."

This was the status of the asylums at the commencement of 1887, before any steps had been instituted to enforce the law which had become operative in October, 1886. Under the provisions of this act, with reference to the cubic air space for beds in dormitories, 600 cubic feet were required, unless by special permit from the Health Department this limit might be modified. All, with one exception, were found to be in violation of the law. Up to this time, overcrowding was the rule. Applications for special permits were now presented to the Board of Health, which were referred to the Medical Inspector detailed for that duty, upon whose recommendation, after careful measurements and with reference to adequate ventilation of the dormitories, a smaller number of cubic feet of air space per bed with one occupant was allowed, the usual allowance being 300 to 400 cubic feet, insisting upon all other requirements of 2 feet of space between beds. Wherever the sanitary appliances were found inadequate or defective these were remedied, either voluntarily or through orders of the Board of Health.

As a result the evil of overcrowding immediately ceased, cubic air and floor space limited the number of admissions to the number of beds. Lavatory accommodations were improved, old wash-basins were discarded, running water was provided, clean, individual towels were daily supplied, clean sheets for beds were insisted upon, and in many instances old straw and husk mattresses were discarded and in place thereof wire spring bed bottoms, covered with folded woolen blankets, substituted.

Some asylums had homes in different localities, in buildings illy adapted for the purpose, and where it was found almost impossible to enforce good sanitary requirements, or to properly isolate and quarantine contagious diseases. Frequent and almost unlimited visiting by parents, guardians or friends was found to be one of the most prolific sources for the communication and spread of these diseases among the children. These have now been limited to monthly visiting days in most of the asylums.

By constant inspection and enforcement of the sections of the law a gradual improvement soon became apparent. Asylums with scattered locations soon realized the economical necessity of concentration, where, under one supervision, with an undivided responsibility, the housing and care of these unfortunates could be better and more economically effected. The provision of a regular medical attendant, the careful examination of every new admission, the temporary quarantine during the probable incubative period of infective or contagious diseases, resulted in most decided improvements, especially controlling the spread of contagious diseases. The dormitory limitations immediately arrested the tendency to overcrowding and secured free ventilation, with appropriate cubic air space per capita. The personal supervision and accountability of the medical attendant, as required by section 5 of the original law, and reiterated in section 205 of the Law of 1893, requiring a monthly report in duplicate to the local Board of Health and to the Board of Managers, was intended to secure a regular and constant examination of the physical and sanitary conditions and environments of the inmates of each institution.

The intent of the law, suggested by the eminent Committee of the Academy of Medicine, was to secure to the unfortunate wards of the city the best possible care for their physical and moral welfare; to arrest the alarming spread of contagious ophthalmia; also to reduce to the minimum the dangers from all other contagious and infectious diseases of children.

Supplemental to these legal requirements, the Board of Health designated one of its Medical Inspectors to visit the institutions and observe the general sanitary conditions, note infractions of the law, and secure the best possible improvements in the general management and construction, such as experience might suggest.

The results of the operation of this wise law have been highly beneficial. At the present date all (with one exception) of the institutions then examined, which are still in existence, are found in the most improved sanitary conditions. Several have abandoned their old buildings and constructed new ones, introducing the best modern appliances for good sanitation.

The requirements of the law are rigidly enforced, so that now every institution has a regular medical attendant, who complies with all requirements and duties prescribed under sections 5 and 6 of the law, and the respective boards of management are alert to carry out its general provisions, in compliance with sections 3, 4, 6 and 7.

Whatever suggestions have been made by the Board of Health through its officers, with reference to the sanitary conditions, of plumbing, ventilation and care of the inmates, whenever suffering from contagious diseases, have been complied with. Items not included specifically in the law, such as instituting improved methods of bathing under the spray bath system, washing in running water, supplying daily individual towels, personal hair and tooth brushes and combs, and isolating the contagious ophthalmia cases to special wash-troughs, with special towels, disinfected after use, separately laundried, and other details to prevent the spread of contagious diseases, have been cheerfully adopted and carried out by the managers. With two or three exceptions (where ample facilities for isolation are provided for the care of contagious diseases), all the institutions now prefer to place their children suffering from contagious diseases, other than ophthalmic cases, in the charge and care of the Health Department.

Prompt removal of the initial outbreak, followed by efficient fumigation and disinfection, has proved the most satisfactory and certain means for arresting epidemic consequences. Limiting the exposure reduces the spread to the minimum.

There are at present 37 institutions within the limits of this city in which children are received and cared for. As an illustration of the direct benefits resulting from the enforcement of the law, especially with reference to contagious ophthalmia, the following table is presented, showing comparatively the conditions as reported in 1886, with those of the present date (1896, inclusive,) in the same institutions. (The table for 1886 is from the official report of the Committee of the Academy of Medicine to the Legislature.)

	1886.		1896.		Per Cent. for 1886.	Per Cent. for 1896.
	Number of Inmates.	Number of Cases.	Number of Inmates.	Number of Cases.		
Catholic Orphan Asylum (female)	409	203	478	None.	49.63	....
Catholic Orphan Asylum (male)	357	246	510	None.	68.90	....
s' Deborah Nursery	239	50	108	40	25.10	37.03
ork Orphan Asylum	193	93	208	None.	48.23	....
ph's Orphan Asylum	521	304	801	35	58.36	4.35
ph's Industrial Home (Eighty-first street)	637	137	510	5	21.50	.98
Immaculate Virgin	442	149	250	None.	33.71	....
ork Juvenile Asylum	846	140	914	49	16.54	5.36
oints House of Industry	233	155	332	7	66.52	2.10
ork Catholic Protectory	2,223	871	2,241	148	39.18	6.60
can Convent, Our Lady of the Rosary	322	59	264	None.	18.32	....
ant Episcopal Orphan Asylum	148	72	125	None.	48.64	....
es' Home	132	28	95	None.	21.21	....
ant Half-Orphan Asylum	171	57	210	None.	33.33	....
of Refuge, Randall's Island	752	122	820	55	16.22	6.70
l Orphan Asylum	326	29	308	None.	8.89	....
for the Friendless	109	4	182	None.	3.66	....
's Home	69	18	360	45	26.08	12.50
v Sheltering Guardian Society	343	94	731	59	21.60	8.07
v Orphan Asylum	462	57	815	None.	12.33	....

* This institution has now been closed up and abandoned.

ther institutions, presenting a very small percentage in 1886, are not included in the ing table, none of them having during the past year (1896) recorded any contagious almia as present.

s will be observed, there is a remarkable reduction in the number of cases in all of the tions, notwithstanding the increase in the number of inmates, with one exception—the Ladies' ah Nursery—where there has been neither the best sanitary environments, isolation, nor al care, which have been observed and practised in other institutions. This institution has een closed by the action of the Board of Health on account of its bad sanitary conditions.

his improvement is undoubtedly due largely to the provisions of the Law of 1886, compell e attachment of a regular physician to each institution, whose duty is prescribed by the l examination of every applicant for admission, either rejecting such as were afflicted with gious ophthalmia, or, if admitting them, placing them under medical and surgical treatment, t, in the majority of instances, with that strict isolation and quarantine so absolutely essen the prevention of the spread of such disease. As a consequence, in some of the larger tions the disease has continued persistently, accessions of new cases increasing the difficulty dication. However, under positive action taken by the Board of Health recently, these tions have adopted more exact and stringent measures of isolation and quarantine, the benefits ich are already becoming apparent. In the majority of the institutions it is possible to ate this disease by rigid exclusion of new applicants under careful examinations of the eyes such; but one careless oversight in such cases, by admitting the infection to the common unity of the well children, will inevitably result in its spread, not alone of this special con n, but of other equally infectious diseases of the skin and scalp. Too great care in the pre ary examinations cannot be exercised, and thereafter unceasing vigilance is the price of safety.

n this connection, it may be stated that it is claimed that all of the cases as given in the fore table should not be classed as contagious ophthalmia. There are admitted to be various ions of the conjunctiva that are not communicable, the distinction being broadly understood nly such conjunctival affections as present a discharge of purulent or muco-purulent character ontagious. There seems to be a line of demarcation, even among the most expert ophthal gists, which it is almost impossible to define, with respect to the contagious or non-contagious tions, especially so when the eyes are examined after the morning ablution.

he statements of children, when questioned whether the eyelids stick together in the ng, are not always reliable. Only a careful inspection before the morning wash can make a ve certainty of the presence or absence of secretion. Neither does it seem safe to claim that fectious case is cured, unless there is an entire absence of granulations and discharge for considerable length of time, as relapses are by no means infrequent. If relapses, so com y observed in these cases, did not so frequently occur, it might be conceded that isolation and ntine need not be so rigidly enforced. But these recurring attacks, while the conjunctivæ t in a chronic inflammatory condition, and very susceptible, wherein a secretion may sud be manifested, would seem to militate against and forbid the exemption from isolation and quarantine until all doubt upon that score is dissipated. The benefit of the doubt should accrue to the well-eyed children in all cases. Among that class of institution children there seems to be a peculiar susceptibility during the first year or two after admission, owing perhaps to their generally impoverished physical conditions, previous habits of uncleanliness, or constitutional idiosyncrasies.

In this connection it may not be amiss to call attention to the fact that not infrequently contagious ophthalmia has been observed during visits of your inspector to public, parochial and industrial schools, where children suffering from this disease may be found in close and intimate proximity; and in the proposed school inspection a careful and specific examination of the eyes should be one of the requirements, this disease being only discoverable by everting the lids.

Experience has taught the necessity of regular official monthly, or oftener, inspections and examinations by the medical officer of your Department, to maintain the law's mandates, in securing the constant compliance of its provisions.

Any neglect of duty by the medical attendant of such institutions, either by careless preliminary examinations of new admissions, or oversight of such cases of infectious or contagious diseases as may be developed after admission, are almost sure to be followed by an endemic, oftentimes very difficult to control, as has been demonstrated in at least two institutions within the past two years.

Not only has the supervision of the Health Department been the direct means of securing the present greatly improved sanitary conditions in these institutions, and by these means established better physical results among the inmates; it has also lessened in large measure the spread of contagious diseases among them by prompt isolation or removal to the contagious hospitals of the incipient cases, thereby limiting the further spread of such. The majority of the managers have come to recognize the value of such precautions, and found it to be for the best interest of the well inmates that the initial cases should be promptly removed by the Board of Health to its contagious disease hospitals.

When otherwise decided upon, it rarely happens that such diseases, peculiarly pertaining to infantile or child life, do not spread among the well inmates, becoming endemic therein.

The great difficulty of securing and maintaining perfect isolation and quarantine in any asylum not having a detached building for such use is so great, that only the prompt removal of such infective or contagious diseases to an isolated and properly conducted hospital should be the rule.

Following up the removal, disinfection and fumigation of the occupied room, bedding, clothing or other possibly infected material has proved, in numberless instances, the value of such procedure in virtually stamping out the disease, while when such patients have been retained and treated in the asylums, there can be but little assurance of limitation until all susceptible to the disease in the institution have passed through the same.

The wise provisions of the law, for the "better preservation of the health of children in institutions," as is herein shown, have been proved of inestimable value in preventing disease and saving of life.

Respectfully submitted,
MOREAU MORRIS, M. D.,
Medical Inspector.

To CHAS. F. ROBERTS, M. D.,
Sanitary Superintendent:

SIR—I have the honor to make the following report of the patients treated in Willard Parker Hospital for the year ending December 31, 1896:

WILLARD PARKER HOSPITAL.

General Statement.

1896.	MALES.	FEMALES.	NATIVE.	FOREIGN.	TOTAL.	ACCOMPANYING.
Remaining in Hospital December 31, 1895......	36	30	52	14	66	..
Admitted	572	643	983	232	1,215	5
Total....................................	608	673	1,035	246	1,281	5
Discharged	445	504	733	216	949	5
Died....................................	119	126	227	18	245	..
Total....................................	564	630	960	234	1,194	5
Remaining in Hospital December 31, 1896......	44	43	75	12	87	..

REMAINING IN HOSPITAL DECEMBER 31, 1895.

	CLASS.			NATIVE.			FOREIGN.			Total Males and Females.	Accompanying.
	City.	Public Institutions.	Quarantine.	Males.	Females.	Total.	Males.	Females.	Total.		
Scarlet fever	10	19	..	14	9	23	4	2	6	29	..
Diphtheria	27	10	..	16	13	29	2	6	8	37	..
Total	37	29	..	30	22	52	6	8	14	66	..
ADMITTED.											
Scarlet fever	200	192	..	135	157	292	37	63	100	392	5
Diphtheria	528	295	..	346	345	691	54	78	132	823	..
Total	728	487	..	481	502	983	91	141	232	1,215	5
DISCHARGED.											
Scarlet fever	167	164	..	108	129	237	36	58	94	331	5
Diphtheria	375	243	..	250	246	496	51	71	122	618	..
Total	542	407	..	358	375	733	87	129	216	949	5
DIED.											
Scarlet fever	18	22	..	13	22	35	1	4	5	40	..
Diphtheria	160	45	..	100	92	192	5	8	13	205	..
Total	178	67	..	113	114	227	6	12	18	245	..
REMAINING IN HOSPITAL DECEMBER 31, 1896.											
Scarlet fever	25	25	..	28	15	43	4	3	7	50	..
Diphtheria	20	17	..	12	20	32	..	5	5	37	..
Total	45	42	..	40	35	75	4	8	12	87	..

RECAPITULATION OF REPORT FOR YEAR ENDING DECEMBER 31, 1896.

	REMAINING IN HOSPITAL DECEMBER 31, 1895.		ADMITTED DURING THE YEAR.		DISCHARGED DURING THE YEAR.		DIED DURING THE YEAR.		REMAINING IN HOSPITAL DECEMBER 31, 1896.	
	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.
Scarlet fever	18	11	172	220	144	187	14	26	32	18
Diphtheria	18	19	400	423	301	317	105	100	12	25
Accompanying	..	..	..	5	..	5	..	..	..	..
Total	36	30	572	648	445	509	119	126	44	43

REPORT BY AGES OF PATIENTS.

	REMAINING DECEMBER 31, 1895.				ADMITTED DURING YEAR.				DISCHARGED DURING YEAR.				DIED DURING YEAR.				REMAINING DECEMBER 31, 1896.			
	Under 5 Years.	5 to 16 Years.	Over 16 Years.	Total.	Under 5 Years.	5 to 16 Years.	Over 16 Years.	Total.	Under 5 Years.	5 to 16 Years.	Over 16 Years.	Total.	Under 5 Years.	5 to 16 Years.	Over 16 Years.	Total.	Under 5 Years.	5 to 16 Years.	Over 16 Years.	Total.
Scarlet fever......	9	6	14	29	150	141	101	392	112	116	103	331	27	9	4	40	20	22	8	50
Diphtheria.......	23	8	6	37	485	223	115	823	310	200	108	618	177	18	10	205	21	13	3	37
Total	32	14	20	66	635	364	216	1,215	422	316	211	949	204	27	14	245	41	35	11	87

MORTALITY PER CENTUM.

	UNDER 5 YEARS.	5 TO 16 YEARS.	OVER 16 YEARS.	TOTAL.
Scarlet fever..........................	16.9	6.1	3.5	9.5
Diphtheria..........................	34.8	7.8	8.3	23.8

Respectfully submitted,

WM. L. SOMERSET, M. D.,
Resident Physician.

To CHARLES F. ROBERTS, M. D.,
Sanitary Superintendent :

SIR—I have the honor to make the following report of the patients treated at Reception Hospital for the year ending December 31, 1896:

RECEPTION HOSPITAL.

General Statement.

1896.	MALES.	FEMALES.	NATIVE.	FOREIGN.	TOTAL.	ACCOMPANYING.
Remaining in Hospital December 31, 1895......	4	5	5	4	9	1
Admitted..........................	401	369	558	212	770	13
Total..........................	405	374	563	216	779	14
Discharged..........................	78	88	109	57	166	10
Transferred..........................	304	264	414	154	568	4
Died..........................	18	20	34	4	38	....
Total..........................	400	372	557	215	772	14
Remaining in Hospital December 31, 1896......	5	2	6	1	7	..

REMAINING IN HOSPITAL DECEMBER 31, 1895.

	CLASS.			NATIVE.			FOREIGN.			Total Males and Females.
	City.	Public Institutions.	Quarantine.	Males.	Females.	Total.	Males.	Females.	Total.	
Measles	..	2	..	2	..	2	..	..	..	2
Diphtheria	..	1	..	1	..	1	..	..	..	1
Scarlet fever	..	1	..	..	1	1	..	..	..	1
Suspects	4	1	..	1	..	1	..	4	4	5
Accompanying	..	..	..	..	..	..	..	..	..	1
Total	4	5	..	4	1	5	..	4	4	10

ADMITTED.

Measles	117	208	..	129	99	228	50	47	97	325
Diphtheria	25	11	..	13	19	32	1	3	4	36
Scarlet fever	15	20	..	11	13	24	5	6	11	35
Small-pox	..	..	5	..	..	..	5	..	5	5
Leprosy	1	2	..	1	..	1	2	..	2	3
Mumps	1	1	..	..	..	..	1	1	2	2
Pertussis	3	..	..	..	3	3	..	..	..	3
Scarlet fever and diphtheria	18	44	..	28	25	53	3	6	9	62
Scarlet fever and varicella	2	9	..	3	6	9	..	2	2	11
Scarlet fever and measles	4	6	..	2	6	8	..	2	2	10
Scarlet fever and mumps	..	1	..	..	1	1	..	..	..	1
Scarlet fever and pertussis	1	..	..	..	1	1	..	..	..	1
Measles and diphtheria	16	7	..	13	5	18	4	1	5	23
Measles and varicella	..	1	..	..	1	1	..	..	..	1
Diphtheria and pertussis	5	14	..	11	7	18	..	1	1	19
Suspects	119	114	..	89	72	161	30	42	72	233
Accompanying	..	..	..	..	..	..	..	..	..	13
Total	327	438	5	300	258	558	101	111	212	783

DISCHARGED.

Measles	3	4	..	2	3	5	..	2	2	7
Diphtheria	14	4	..	7	10	17	..	1	1	18
Scarlet fever	1	4	..	1	2	3	2	..	2	5
Small-pox	..	..	1	..	..	..	1	..	1	1
Mumps	1	1	..	..	..	..	1	1	2	2
Pertussis	3	..	..	..	3	3	..	..	..	3
Scarlet fever and varicella	1	4	..	..	3	3	..	2	2	5
Scarlet fever and pertussis	1	..	..	..	1	1	..	..	..	1
Measles and varicella	..	1	..	..	1	1	..	..	..	1
Diphtheria and pertussis	2	..	..	1	1	2	..	..	..	2
Suspects	64	57	..	45	29	74	18	29	47	121
Accompanying	..	..	..	..	..	..	..	..	..	10
Total	90	75	1	56	53	109	22	35	57	176

DIED.

Measles	4	..	..	3	1	4	..	..	..	4
Diphtheria	5	4	..	2	6	8	..	1	1	9
Scarlet fever	3	2	..	..	5	5	..	..	..	5
Scarlet fever and diphtheria	4	4	..	5	2	7	..	1	1	8
Scarlet fever and measles	1	..	..	1	..	1	..	..	..	1
Measles and diphtheria	3	..	..	3	..	3	..	..	..	3
Suspects	6	2	..	3	3	6	1	1	2	8
Total	26	12	..	17	17	34	1	3	4	38

TRANSFERRED.

	CLASS.			NATIVE.			FOREIGN.			Total Males and Females.
	City.	Public Institutions.	Quarantine.	Males.	Females.	Total.	Males.	Females.	Total.	
Measles	110	206	..	126	95	221	50	45	95	316
Diphtheria	6	4	..	5	3	8	1	1	2	10
Scarlet fever	11	12	..	8	6	14	3	6	9	23
Small-pox	..	..	4	..	..	..	4	..	4	4
Leprosy	1	2	..	1	..	1	2	..	2	3
Scarlet fever and diphtheria	14	40	..	23	23	46	3	5	8	54
Scarlet fever and varicella	1	5	..	3	3	6	..	..	..	6
Scarlet fever and measles	3	6	..	1	6	7	..	2	2	9
Scarlet fever and mumps	..	1	..	..	1	1	..	..	..	1
Measles and diphtheria	13	7	..	10	5	15	4	1	5	20
Diphtheria and pertussis	3	14	..	10	6	16	..	1	1	17
Suspects	51	54	..	40	39	79	10	16	26	45
Accompanying	..	..	..	..	..	..	..	..	..	4
Total	213	351	4	227	187	414	77	77	154	572

REMAINING IN HOSPITAL DECEMBER 31, 1896.

Scarlet fever	..	3	..	2	1	3	..	..	..	3
Suspects	2	2	..	2	1	3	1	..	1	4
Total	2	5	..	4	2	6	1	..	1	7

RECAPITULATION OF REPORT FOR THE YEAR ENDING DECEMBER 31, 1896.

	REMAINING DECEMBER 31, 1895.		ADMITTED DURING YEAR.		DISCHARGED DURING YEAR.		TRANSFERRED DURING YEAR.		DIED DURING YEAR.		REMAINING DECEMBER 31, 1896.	
	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.
Measles	2	..	179	146	2	5	176	140	3	1	..	..
Diphtheria	1	..	14	22	7	11	6	4	2	7	..	..
Scarlet fever	..	1	16	19	3	2	11	12	..	5	2	1
Small-pox	..	..	5	..	1	..	4	..	..	..	..	..
Leprosy	..	..	3	..	..	..	3	..	..	..	..	..
Mumps	..	..	1	1	1	1	..	..	..	..	..	..
Pertussis	..	..	..	3	..	3	..	..	..	..	..	..
Scarlet fever and diphtheria	..	..	31	31	..	..	26	28	5	3	..	..
Scarlet fever and varicella	..	..	3	8	..	5	3	3	..	..	..	..
Scarlet fever and measles	..	..	2	8	..	..	1	8	1	..	..	..
Scarlet fever and mumps	..	..	..	1	..	..	..	1	..	..	..	..
Scarlet fever and pertussis	..	..	..	1	..	1	..	..	..	..	..	..
Measles and diphtheria	..	..	17	6	..	..	14	6	3	..	..	..
Measles and varicella	..	..	..	1	..	1	..	..	..	..	..	..
Diphtheria and pertussis	..	..	11	8	1	1	10	7	..	..	..	..
Suspects	1	4	119	114	63	58	50	55	4	4	3	1
Accompanying	..	1	..	13	..	10	..	4	..	..	..	..
Total	4	6	401	382	78	98	304	268	18	20	5	2

Respectfully submitted,
WM. L. SOMERSET, M. D.,
Resident Physician.

GEORGE B. FOWLER, M. D., NEW YORK, January 1, 1897.
Medical Commissioner, New York City Health Board:

SIR—I have the honor to report as follows: Accompanying will be found the actual number of cases of scarlet fever admitted during each quarter from 1886 to 1896, and the actual number of deaths. During a part of 1894, 1895 and 1896 the service was at Riverside Hospital. These cases are included. The separation of mixed cases of diphtheria and scarlet fever from scarlet fever, by means of bacteriological examination, began, I think, in 1893. The almost uniform reduction in the number of cases admitted during the third quarter of each year is maintained during 1896, the number of cases admitted from July 1 to October 1 being forty-four. Respectfully submitted,

(Signed) W. L. SOMERSET,
Resident Physician, Willard Parker Hospital.

Number of New Cases and Number of Deaths each Quarter 1886–1896, *Inclusive.*

QUARTER.	NO. OF CASES.	NO. OF DEATHS.	MORTALITY, PER CENT.	QUARTER.	NO. OF CASES.	NO. OF DEATHS.	MORTALITY, PER CENT.
1886.				1891.			
First	28	5	17.8	Third	61	16	26.2
Second	27	2	7.4	Fourth	81	15	18.5
Third	3	..	....	1892.			
Fourth	6	2	33.3	First	68	18	26.5
1887.				Second	54	7	13.0
First	38	3	7.9	Third	18	1	5.6
Second	21	..	....	Fourth	44	8	18.2
Third	21	2	9.5	1893.			
Fourth	62	11	17.7	First	106	14	13.2
1888.				Second	106	11	10.4
First	48	11	22.9	Third	26	2	7.7
Second	69	17	24.6	*Fourth	120	12	10.0
Third	48	15	31.2	†1894.			
Fourth	65	7	10.8	First	136	10	7.3
1889.				Second	132	11	8.3
First	84	23	27.4	Third	48	1	2.1
Second	75	14	18.7	Fourth	84	8	9.5
Third	17	1	5.9	‡1895.			
Fourth	30	3	10.0	First	100	19	19.0
1890.				Second	66	7	10.6
First	55	2	3.6	Third	27	6	22.2
Second	38	6	15.8	Fourth	87	8	9.2
Third	20	3	15.0	§1896.			
Fourth	42	6	14.3	First	157	16	10.2
1891.				Second	88	9	10.2
First	79	22	27.8	Third	44	4	9.1
Second	83	27	32.5	Fourth	126	13	10.3

* Last quarter, treated at Riverside.
† Including Riverside Hospital cases.
‡ Including Riverside Hospital cases.
§ Including Riverside Hospital cases.

Yearly Mortality, 1886 *to End of Second Quarter*, 1896.

YEAR.	NUMBER CASES.	NUMBER DEATHS.	MORTALITY, PER CENT.	YEAR.	NUMBER CASES.	NUMBER DEATHS.	MORTALITY, PER CENT.
1886	64	9	14.	1892	184	34	12.
1887	142	16	11.	1893	358	39	11.
1888	230	50	22.	1894	400	30	7.5
1889	206	41	20.	1895	280	40	14.
1890	155	17	20.	1896	415	42	10.
1891	304	80	26.				

Clinical and Statistical Report on 421 Cases of Scarlet Fever Treated in the Willard Parker Hospital During the Year 1896, Submitted to Commissioner G. B. Fowler, M. D., by William L. Somerset, Resident Physician.

Mortality According to Age—Of the 421 cases included in this report, 115 were over sixteen years of age; 147 were between five and sixteen, with an average age of nine; 159 were under five years, with an average age of three years and four months. Of the cases over sixteen 4 died; mortality, 5½ per cent.; of those between five and sixteen 9 died; mortality, 6⅛ per cent.; of those under five 27 died; mortality, 17 per cent.

Stay in Hospital—Average time sick on admission of all cases, 3½ days. Average time in hospital of favorable cases, 41½ days. Average time in hospital of fatal cases, 10½ days. The average time in the hospital of the 132 favorable cases under five years was 43 days; of the cases between five and sixteen, 40 days, and of those over sixteen, 37 days. Cases are discharged immediately on the completion of desquamation.

Second Attacks—Out of the 165 cases questioned, 6 gave a reasonably probable history of a previous attack. In each instance the recurrent attack ran a mild and uncomplicated course. Characteristic desquamation was present, however, in each case.

Pulse and Temperature Curves—Cases under five showed a maximum temperature on the evenings of the second and third days, namely, 102.6 degrees Fahrenheit, with an accompanying maximum pulse of 130. The effect of the disease on the pulse in children is evidently more marked and more lasting than the effect on the temperature, the pulse being above 125 every evening for the first six days, while at the completion of the same time, the temperature had dropped to 99.4 Fahrenheit. Charts 1 and 2 give the temperature and pulse curves for favorable cases under five years from the evening of the first day to the evening of the seventh.

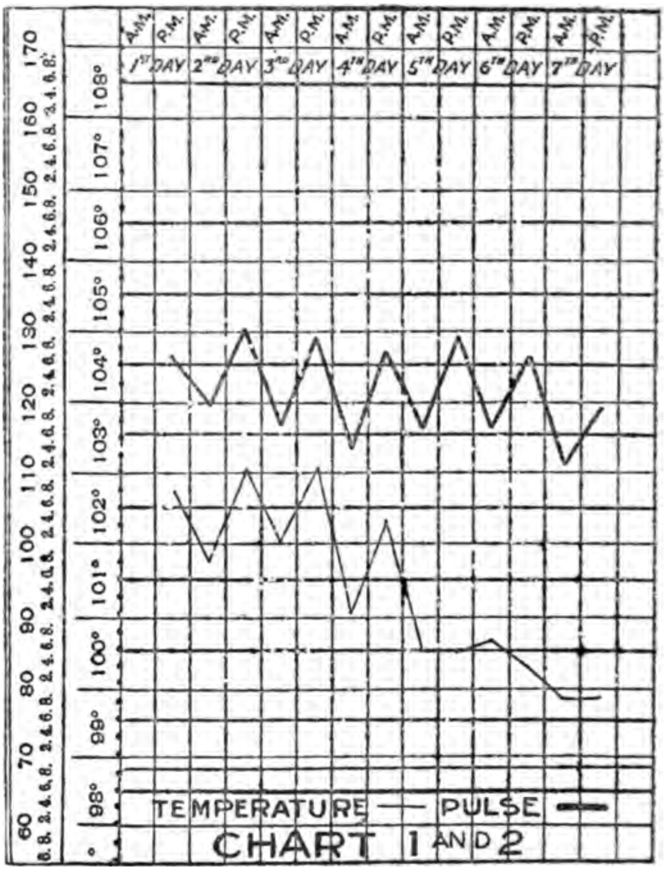
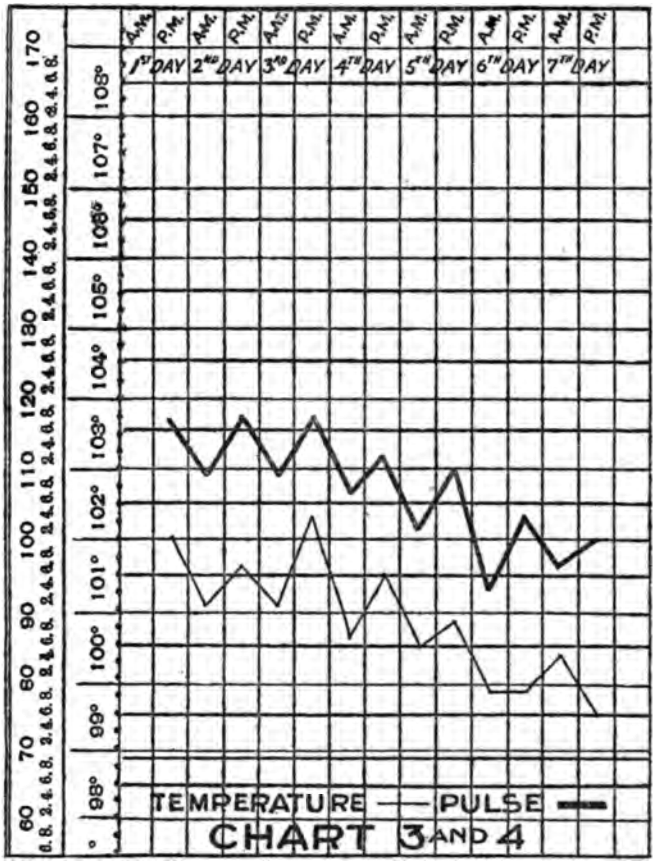
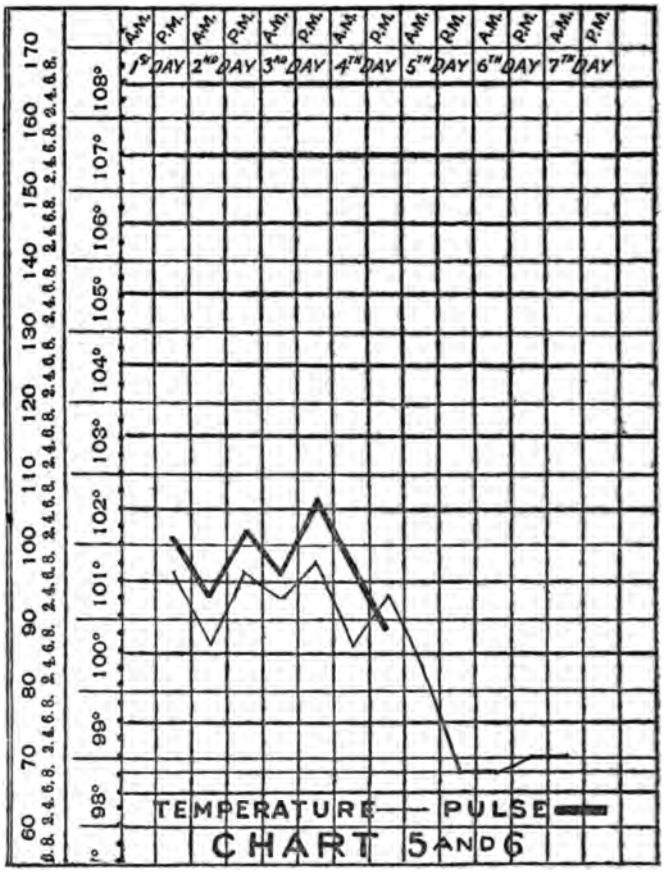


CHART 1 AND 2

Charts 3 and 4 give in a corresponding way the temperature and pulse for cases between five nd sixteen. They show a maximum temperature of 101.8 degrees Fahrenheit on the evening of he third day, with an accompanying pulse of 116. By the end of the seventh day, the tempera- ure of these cases had dropped to 99 degrees Fahrenheit, the pulse being still at 100.



In the cases over sixteen, the effect on both pulse and temperature is less marked and of shorter duration. The temperature again reaching its maximum on the evening of the third day, namely, 101.4 degrees Fahrenheit, with an accompanying pulse of 106. The temperature reached normal on the evening of the fifth day, the fall of the pulse being more rapid, reaching 88 on the morning of the fourth day and remaining under 80 or practically normal thereafter. Charts 5 and 6 give the pulse and temperature in the adult cases.



COMPLICATIONS.

Kidneys—94 cases showed albumen in quantities more than traces, with an appreciable diminution of urine. This condition manifested itself, as a rule, from the seventh to the tenth day, and, in most cases, cleared up within two weeks. 12 children were discharged suffering from albuminuria with slightly diminished urine. 2 adults were discharged with albumen casts and markedly diminished urine; both, however, were hospital cases and came to us suffering from chronic nephritis. 2 deaths were due to kidney complications. It would seem probable, in view of the early onset of the albuminuria and of the correspondingly early disappearance of all symptoms referable to the kidneys, that the pathological condition was a degeneration of kidney epithelium only rather than an actual nephritis.

Throats—In this series of cases, the tonsils and fauces presented no extensive sloughs nor deep ulcerations; pseudo-membrane was present in varying amount in a large number of cases. In no case, unless Klebs-Loeffler bacilli were present, did this membrane extend into the larynx so as to produce symptoms of stenosis; it rarely extended into the nose, and when found there did not produce the complete obstruction so characteristic of nasal diphtheria. In all cases in which the cervical adenitis was extensive, the infection of the throat was also well marked. The occurrence of otitis, however, did not appear to be so regularly dependent on the severity of the faucial condition.

Adenitis—Cervical glands were noticeably swollen in forty-three cases, in thirteen of which operation was necessary. Eleven of the fatal cases were affected with this complication and in eight of them it partook more of the nature of a diffuse cellulitis. The swelling of the glands began, in nearly every case, before the disappearance of the rash, that is within the first five days.

Otitis—A suppurative discharge from the middle ear occurred in twenty-seven cases; bilateral in nine. The onset of this condition was generally after the twelfth day and before the eighteenth; one case occurred as late as the thirtieth day of the disease. The average duration of the condition was twenty-five days. No case left the hospital with a noticeable impairment of hearing in both ears.

Joint Affections—Seventeen cases had joint pains and swelling of sufficient importance to require treatment. The joints affected were, in the main, knees, elbows and shoulders. Four cases developed a small amount ot fluid at the knee. One case required operation. All cases made a good recovery. The condition usually came on during the second week and lasted between two and three weeks. Three of the cases had fairly well marked endocardial murmurs, referable to the mitral valve.

Vaginitis—This complication occurred in about 5 per cent. of the female cases under sixteen years. The only symptom regularly present was the discharge, which always cleared up under cleanliness in about two weeks and seemed to be of little clinical significance.

In two cases the eyes became infected. Recovery slow, but complete.

Other Complications—Bronchitis severe enough to give physical signs occurred in twenty cases. Pleurisy with effusion in two. Pneumonia, in addition to the fatal cases, in ten. Other complications were either absent, unimportant or evidently not connected with the scarlatina.

SYNOPSIS OF FATAL CASES.

Case 1—Three and one-half years old, thirty-four days sick. Excessive bronchitis; marked bilateral cervical adenitis; very feeble and emaciated; died twenty-four hours after admission.

Case 2—Age, forty years. Alcoholic; admitted fifth day. Heart acted very badly in spite of free stimulation; pulmonary œdema developed with fatal result on the fourteenth day.

Case 3—Three years old; twelve days sick on admission. Very foul nose and throat with abundant pseudo membrane. (Culture did not show Klebs-Lœffler bacilli.) Cervical adenitis well marked; very troublesome regurgitation; considerable bronchitis; later, abundant fine rales over both chests behind; respirations up to 80; died the twelfth day.

Case 4—Age two years. Four days sick on admission; nose very foul; neck much swollen; cellulitis of the neck became more diffuse, extending upward on face and downward on chest; very small amount sero-pus evacuated by incisions. Patient became generally septic and died thirteen days after admission.

Case 5—Age nine years; one day sick. Rash very intense; temperature persisted at 104 to 106 degrees Fahrenheit, pulse 140 to 170; patient died third day, with well marked pulmonary œdema.

Case 6—Three years old; one day sick. Course of disease favorable for two weeks, when patient developed broncho-pneumonia; died on the twenty-sixth day.

Case 7—Three years old; three days sick. Intense rash; foul and abundant nasal discharge; much false membrane in throat (no Klebs-Loeffler bacilli); well marked bilateral cervical adenitis; died on the fourth day after admission with heart failure, evidently due to scarlatinal poisoning.

Case 8—Age fourteen months; one day sick. Rash intense and very dark, almost purple, not, however, hæmorrhagic; cervical adenitis well marked; foul throat and nose; died third day.

Case 9—Five years old; one day sick. Very feeble child, suffering from Potts' disease; did well, as far as scarlet fever was concerned, until forty-eight hours before death, when subcutaneous hæmorrhages began to appear, and in twenty-four hours had become very extensive, involving the entire left arm, large areas on both thighs and smaller patches on body; pulse was imperceptible for several hours before death. Autopsy could not be obtained.

Case 10—Age seven months; two days sick. Admitted with mild scarlet and probable broncho-pneumonia; high temperature, rapid breathing and rapid pulse persisted. Child died twenty-one hours after admission.

Case 11—Four years old. Said to be one day sick, but evidently had a fading rash; delirious. Stomach and rectum rebelled against all nourishment and medication. Died the third day.

Case 12—Four years old; five days sick. Well marked rash; extensive broncho-pneumonia; died in twenty-four hours.

Case 13—Twenty-five years old; one day sick. Malignant case; rash universal, very dark in color; did not disappear on pressure; throat very foul, with abundant pseudo-membrane; temperature 105 degrees Fahrenheit, pulse 150; vomiting, slight diarrhea; urine very scant; died in thirty-six hours.

Case 14—Eleven years old; three days sick. Intense and universally distributed rash with several small distinctly hæmorrhagic patches; diffuse bilateral cervical swelling, gradually becoming more and more marked, until on left side became extreme; extensive incision opened up several small pus-foci, evidently broken down glands; no subsidence of the inflammation followed, and the patient died septic three weeks after admission.

Case 15—Patient died from diphtheria with laryngeal involvement.

Case 16—Age nine years. Three weeks sick. Desquamating; moribund on admission: lungs full of œdema; died in six hours.

Case 17—Mild scarlet. Died of broncho-pneumonia.

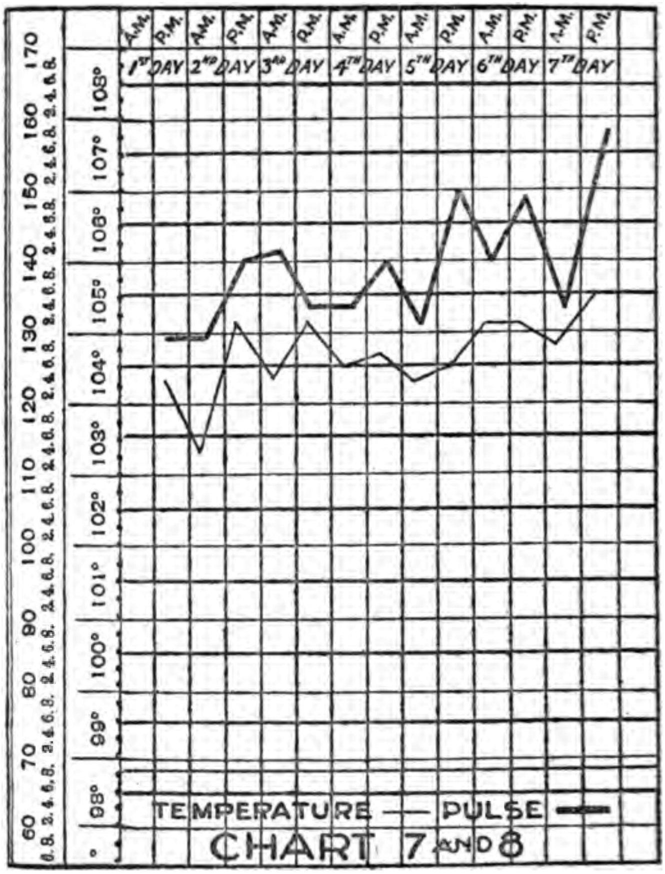
Case 18—One and one-half years old; admitted when two days sick, with temperature 104 degrees Fahrenheit, which rose rapidly to 106 degrees Fahrenheit. On the sixth day temperature reached 107 degrees Fahrenheit. Child died on seventh day. The response of the temperature to the measures employed for its reduction—baths and packs—was in every instance slight and transient.

Case 19—Age five years; said to be only one day sick. Urine insufficient on admission; case lived thirty-four days. Maximum amount passed during any twenty-four hours, eight ounces; during last four days no urine was passed.

Case 20—Septic on admission; lived two days.

Of the remaining twenty fatal cases, five died from sepsis following diffuse cellulitis; six had severe bronchitis, no pneumonia made out; four had broncho-pneumonia; one was syphilitic; one passed no urine after admission and died in twenty-four hours; three were moribund on admission.

(Charts 7 and 8 give the pulse and temperature curves of the fatal cases. The marked difference in the course of these curves, especially after the third day, from those shown in Charts 1 and 2 may serve as a slight aid in prognosis).



NEW YORK, December 31, 1896.

CHARLES F. ROBERTS, M. D.,
Sanitary Superintendent:

SIR—I have the honor to transmit herewith the annual report of Riverside Hospital for the year 1896.

TABLE SHOWING NUMBER OF PATIENTS ADMITTED EACH MONTH, 1896.

DISEASES.	REMAINING JAN. 1, 1896.		JANUARY.		FEBRUARY.		MARCH.		APRIL.		MAY.		JUNE.		JULY.	
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
Small-pox	3	..	..	..	1	..	..	..	1	..	1	..	..	..	..	..
Typhus fever	..	..	..	..	..	..	1	1	..	..	..	..	..	..	..	..
Measles	9	7	22	16	33	22	31	24	29	25	33	21	9	16	6	5
Scarlet fever	13	11	..	..	..	..	..	..	..	9	12	..	1	..	..	..
Diphtheria	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1
Scarlet fever with diphtheria	1	3	2	4	1	..	3	2	3	2	1	1	..	3	..	2
Scarlet fever with measles	2	..	..	..	..	..	..	1	..	4	1	2	..	1	..	..
Scarlet fever with parotitis	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..
Scarlet fever with pertussis	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..
Scarlet fever with varicella	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..
Measles with diphtheria	..	..	2	..	1	3	1	1	1	..	2	1	3	..	5	1
Diphtheria with pertussis	..	..	..	..	1	1	..	1	..	..	..	..	..	..	..	..
Diphtheria with pertussis and scarlet fever	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Leprosy	4	..	..	..	..	..	1	..	..	..	..	..	..	..	1	..
Observation	..	2	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Total patients	32	23	26	20	38	27	37	30	44	43	38	26	12	20	12	9
Accompanying	..	2	..	1	..	..	..	..	..	1	..	..	..	1	..	1
Total	57		47		65		67		88		64		33		22	
Average daily attendance	..		44.71		38.24		36.45		50.57		49.23		28.03		20.23	

DISEASES.	AUGUST.		SEPTEMBER.		OCTOBER.		NOVEMBER.		DECEMBER.		TOTAL ADMITTED.		TOTAL TREATED.		REMAINING DEC. 31, 1896.	
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
Small-pox	..	..	..	..	..	..	..	..	1	..	4	..	7	..	1	..
Typhus fever	..	..	..	..	..	..	..	..	..	..	1	1	1	1	..	..
Measles	8	10	4	1	4	4	3	9	6	2	188	155	197	162	4	2
Scarlet fever	..	..	..	..	..	..	..	..	..	..	9	13	22	24	..	..
Diphtheria	..	..	..	..	..	..	..	..	..	..	..	1	..	1	..	..
Scarlet fever with diphtheria	1	1	3	4	1	1	5	3	6	7	26	30	27	33	7	4
Scarlet fever with measles	..	1	..	..	..	..	..	1	..	..	1	10	3	10	..	..
Scarlet fever with parotitis	..	..	..	..	..	..	..	..	..	..	..	1	..	1	..	..
Scarlet fever with pertusis	..	..	..	..	..	..	..	..	..	..	1	..	1	..	..	..
Scarlet fever with varicella	..	..	..	..	..	..	2	4	..	3	3	7	3	7	2	5
Measles with diphtheria	1	3	1	..	3	..	2	1	2	1	24	11	24	11	1	..
Diphtheria with pertussis	..	..	1	..	8	4	1	1	1	3	12	10	12	10	..	1
Diphtheria with pertussis and scarlet fever	..	..	..	..	..	..	1	..	..	..	1	..	1	..	..	..
Leprosy	..	..	1	..	..	..	..	..	..	..	3	..	7	..	3	..
Observation	..	..	..	..	..	..	..	..	..	..	..	..	..	2	..	..
Total patients	10	15	10	5	16	9	14	19	16	16	273	239	305	262	18	12
Accompanying	..	1	..	1	..	..	..	..	..	1	..	7	..	9	..	1
Total	26		16		25		33		33		519		576		31	
Average daily attendance	23.39		17.30		18.65		29.00		39.20		....		32.90		....	

SMALL-POX.

	City.	Quarantine.	Public Hospitals.	Other Places.	Male.	Female.	White.	Colored.	Native.	Foreign.	Total.
Remaining January 1, 1896	..	3	..	..	3	..	3	..	..	3	3
Admitted	..	4	..	..	4	..	3	1	..	4	4
Total treated	..	7	..	..	7	..	6	1	..	7	7
Discharged	..	5	..	..	5	..	5	..	..	5	5
Died	..	1	..	..	1	..	1	..	..	1	1
Remaining December 31, 1896	..	1	..	..	1	..	..	1	..	1	1

Mortality, 14.30 per cent.

TYPHUS FEVER.

Remaining January 1, 1896	..	..	..	..	..	..	..	..	..	..	..
Admitted	..	..	2	..	1	1	2	..	..	2	2
Total treated	..	..	2	..	1	1	2	..	..	2	2
Discharged	..	..	2	..	1	1	2	..	..	2	2
Died	..	..	..	..	..	..	..	..	..	..	..
Remaining December 31, 1896	..	..	..	..	..	..	..	..	..	..	..

Mortality, 0 per cent.

MEASLES.

Remaining January 1, 1896	7	..	2	7	9	7	16	..	11	5	16
Admitted	131	1	147	64	188	155	325	18	239	104	343
Total treated	138	1	149	71	197	162	341	18	250	109	359
Discharged	121	..	124	64	174	135	292	17	208	101	309
Died	14	..	25	5	19	25	43	1	39	5	44
Remaining December 31, 1896	3	1	..	2	4	2	6	..	3	3	6

Mortality, 12.26 per cent.

SCARLET FEVER.

Remaining January 1, 1896	14	1	4	5	13	11	24	..	16	8	24
Admitted	15	..	5	2	9	13	21	1	11	11	22
Total treated	29	1	9	7	22	24	45	1	27	19	45
Discharged	28	1	8	7	21	23	43	1	26	18	44
Died	1	..	1	..	1	1	2	..	1	1	2
Remaining December 31, 1896	..	..	..	..	..	..	..	..	..	..	..

Mortality, 4.55 per cent.

DIPHTHERIA.

Remaining January 1, 1896	..	..	..	..	..	..	..	..	..	..	..
Admitted	1	..	..	..	..	1	1	..	..	1	1
Total treated	1	..	..	..	..	1	1	..	..	1	1
Discharged	1	..	..	..	..	1	1	..	..	1	1
Died	..	..	..	..	..	..	..	..	..	..	..
Remaining December 31, 1896	..	..	..	..	..	..	..	..	..	..	..

Mortality, 0 per cent.

SCARLET FEVER WITH DIPHTHERIA.

	City.	Quarantine.	Public Hospitals.	Other Places.	Male.	Female.	White.	Colored.	Native.	Foreign.	Total.
Remaining January 1, 1896	1	3	..	..	1	3	4	..	1	3	4
Admitted	42	..	7	7	26	30	55	1	45	11	56
Total treated	43	3	7	7	27	33	59	1	46	14	60
Discharged	18	3	5	3	12	17	28	1	20	9	29
Died	18	..	..	2	8	12	20	..	17	3	20
Remaining December 31, 1896	7	..	2	2	7	4	11	..	9	2	11

Mortality, 33.33 per cent.

SCARLET FEVER WITH MEASLES.

Remaining January 1, 1896	1	..	..	1	2	..	2	..	2	..	2
Admitted	8	..	1	2	1	10	11	..	9	2	11
Total treated	9	..	1	3	3	10	13	..	11	2	13
Discharged	7	..	1	1	1	8	9	..	8	1	9
Died	2	..	..	2	2	2	4	..	3	1	4
Remaining December 31, 1896	..	..	..	..	..	..	..	..	..	..	..

Mortality, 30.77 per cent.

SCARLET FEVER WITH PAROTITIS.

Remaining January 1, 1896	..	..	..	..	..	..	..	..	..	..	..
Admitted	..	..	..	1	..	1	1	..	1	..	1
Total treated	..	..	..	1	..	1	1	..	1	..	1
Discharged	..	..	..	1	..	1	1	..	1	..	1
Died	..	..	..	..	..	..	..	..	..	..	..
Remaining December 31, 1896	..	..	..	..	..	..	..	..	..	..	..

Mortality, o per cent.

SCARLET FEVER WITH PERTUSSIS.

Remaining January 1, 1896	..	..	..	..	..	..	..	..	..	..	..
Admitted	1	..	..	..	1	..	1	..	1	..	1
Total treated	1	..	..	..	1	..	1	..	1	..	1
Discharged	1	..	..	..	1	..	1	..	1	..	1
Died	..	..	..	..	..	..	..	..	..	..	..
Remaining December 31, 1896	..	..	..	..	..	..	..	..	..	..	..

Mortality, o per cent.

SCARLET FEVER WITH VARICELLA.

Remaining January 1, 1896	..	..	..	..	..	..	..	..	..	..	..
Admitted	4	1	..	5	3	7	10	..	8	2	10
Total treated	4	1	..	5	3	7	10	..	8	2	10
Discharged	1	..	..	2	1	2	3	..	3	..	3
Died	..	..	..	..	..	..	..	..	..	..	..
Remaining December 31, 1896	3	1	..	3	2	5	7	..	5	2	7

Mortality, o per cent.

MEASLES WITH DIPHTHERIA.

	City.	Quarantine.	Public Hospitals.	Other Places.	Male.	Female.	White.	Colored.	Native.	Foreign.	Total.
Remaining January 1, 1896	..	..	..	..	..	..	..	..	..	..	..
Admitted	25	..	5	5	24	11	35	..	29	6	35
Total treated	25	..	5	5	24	11	35	..	29	6	35
Discharged	14	..	..	4	11	7	18	..	14	4	18
Died	11	..	4	1	12	4	16	..	14	2	16
Remaining December 31, 1896	..	..	1	..	1	..	1	..	1	..	1

Mortality, 45.71 per cent.

DIPHTHERIA WITH PERTUSSIS.

	City.	Quarantine.	Public Hospitals.	Other Places.	Male.	Female.	White.	Colored.	Native.	Foreign.	Total.
Remaining January 1, 1896	..	..	..	..	..	..	..	..	..	..	..
Admitted	13	..	1	8	12	10	22	..	20	2	22
Total treated	13	..	1	8	12	10	22	..	20	2	22
Discharged	11	..	1	7	11	8	19	..	17	2	19
Died	1	..	..	1	1	1	2	..	2	..	2
Remaining December 31, 1896	1	..	..	..	..	1	1	..	1	..	1

Mortality, 9.10 per cent.

DIPHTHERIA WITH PERTUSSIS AND SCARLATINA.

	City.	Quarantine.	Public Hospitals.	Other Places.	Male.	Female.	White.	Colored.	Native.	Foreign.	Total.
Remaining January 1, 1896	..	..	..	..	..	..	..	..	..	..	..
Admitted	..	..	..	1	1	..	1	..	1	..	1
Total treated	..	..	..	1	1	..	1	..	1	..	1
Discharged	..	..	..	1	1	..	1	..	1	..	1
Died	..	..	..	..	..	..	..	..	..	..	..
Remaining December 31, 1896	..	..	..	..	..	..	..	..	..	..	..

Mortality, 0 per cent.

LEPROSY.

	City.	Quarantine.	Public Hospitals.	Other Places.	Male.	Female.	White.	Colored.	Native.	Foreign.	Total.
Remaining January 1, 1896	2	1	1	..	4	..	2	2	..	4	4
Admitted	2	..	1	..	3	..	2	1	1	2	3
Total treated	4	1	2	..	7	..	4	3	1	6	7
Discharged	2	..	..	..	2	..	..	2	..	2	2
Died	1	..	1	..	2	..	2	..	1	1	2
Remaining December 31, 1896	1	1	1	..	3	..	2	1	..	3	3

Mortality, 28.57 per cent.

OBSERVATION.

	City.	Quarantine.	Public Hospitals.	Other Places.	Male.	Female.	White.	Colored.	Native.	Foreign.	Total.
Remaining January 1, 1896	..	2	..	..	..	2	2	..	..	2	2
Admitted	..	..	..	..	..	..	..	..	..	..	..
Total treated	..	2	..	..	..	2	2	..	..	2	2
Discharged	..	2	..	..	..	2	2	..	..	2	2
Died	..	..	..	..	..	..	..	..	..	..	..
Remaining December 31, 1896	..	..	..	..	..	..	..	..	..	..	..

Mortality, 0 per cent.

TOTAL PATIENTS.

	City.	Quarantine.	Public Hospitals.	Other Places.	Male.	Female.	White.	Colored.	Native.	Foreign.	Total.
aining January 1, 1896	25	10	7	13	32	23	53	2	30	25	55
itted	242	6	169	95	273	239	490	22	365	147	512
Total treated	267	16	176	108	305	262	543	24	395	172	567
harged	204	11	141	90	241	205	425	21	299	147	446
l.	48	1	31	11	46	45	90	1	77	14	91
aining December 31, 1896	15	4	4	7	18	12	28	2	19	11	30

Mortality, 16.05 per cent.

ACCOMPANYING.

aining January 1, 1896	..	2	..	..	..	2	2	..	..	2	2
itted	5	..	2	..	..	7	7	..	4	3	7
Total treated	5	2	2	..	..	9	9	..	4	5	9
harged	5	2	1	..	..	8	8	..	4	4	8
l.	..	..	..	..	..	..	..	..	..	..	..
aining December 31, 1896	..	..	1	..	..	1	1	..	..	1	1

Mortality, 0 per cent.

Average daily attendance—

ents		32.90
p, hospital	44.20	
steamboat	5.	
		49.20
Total		82.10
aber of dead bodies received		212
nber of trips made by steamboat "Franklin Edson"		580

Table Showing Rate of Mortality

DISEASES.	SEXES.	AGES.															
		UNDER 1 MONTH.				UNDER 1 YEAR.				UNDER 2 YEARS.				UNDER 5 YEARS.			
		Total Treated.	Died.	Remaining.	Mortality Per cent.	Total Treated.	Died.	Remaining.	Mortality Per cent.	Total Treated.	Died.	Remaining.	Mortality Per cent.	Total Treated.	Died.	Remaining.	Mortality Per cent.
Small-pox	Male.	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..
	Female.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Typhus fever	Male.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
	Female.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Measles	Male.	..	..	..	..	9	4	..	44+	10	4	..	40	40	9	..	23½
	Female.	..	..	..	..	9	4	..	44+	13	9	1	69+	35	11	..	31+
Scarlet fever	Male.	..	..	..	..	1	..	..	..	..	..	..	..	5	1	..	20
	Female.	..	..	..	..	1	..	..	..	..	..	..	..	6	..	..	..
Diphtheria	Male.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
	Female.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Scarlet fever with diphtheria	Male.	..	..	..	..	..	..	..	..	..	..	..	..	12	3	2	25
	Female.	..	..	..	..	1	1	..	100	1	1	..	100	14	7	1	50
Scarlet fever with measles	Male.	..	..	..	..	..	..	..	..	1	1	..	100	2	1	..	50
	Female.	..	..	..	..	..	..	..	..	..	..	..	..	5	2	..	40
Scarlet fever with parotitis	Male.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
	Female.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Scarlet fever with pertussis	Male	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
	Female.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Scarlet fever with varicella	Male.	..	..	..	..	..	..	..	..	1	..	..	..	2	..	2	..
	Female.	..	..	..	..	..	..	..	..	..	..	..	..	4	..	2	..
Measles with diphtheria	Male.	..	..	..	..	1	1	..	100	3	2	1	67—	16	9	..	56+
	Female.	..	..	..	..	1	..	..	..	1	..	..	..	9	4	..	44+
Diptheria with pertussis	Male.	..	..	..	..	..	..	..	..	1	..	..	..	9	1	..	11+
	Female.	..	..	..	..	..	..	..	..	1	..	..	..	6	1	1	17—
Diphtheria with pertussis and scarlet fever	Male.	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..
	Female.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Leprosy	Male.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
	Female.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Observation	Male.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
	Female.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Male	....	..	..	..	..	11	5	..	45+	16	7	1	44—	88	24	4	27+
Female	....	..	..	..	..	12	5	..	42—	16	10	1	62½	79	25	4	32—
Total	....	..	..	..	..	23	10	..	43+	32	17	2	53+	167	49	8	29+

According to Age and Sex.

AGES.																							
5 TO 15 YEARS.				15 TO 25 YEARS.				25 TO 45 YEARS.				45 TO 65 YEARS.				65 YEARS AND OVER.				ALL AGES.			
Total Treated.	Died.	Remaining.	Mortality Per cent.	Total Treated.	Died.	Remaining.	Mortality Per cent.	Total Treated.	Died.	Remaining.	Mortality Per cent.	Total Treated.	Died.	Remaining.	Mortality Per cent.	Total Treated.	Died.	Remaining.	Mortality Per cent.	Total Treated.	Died.	Remaining.	Mortality Per cent.
2	..	..	..	3	1	1	33+	1	..	..	..	..	..	..	..	..	..	..	..	7	1	1	14+
..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..
..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..
43	1	3	2+	63	1	1	2—	32	..	..	..	..	..	..	..	..	..	..	..	197	19	4	9+
32	..	..	..	51	..	1	..	22	1	..	5—	..	..	..	..	..	..	..	..	162	25	2	15—
8	..	..	..	7	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	22	1	..	5—
9	..	..	..	5	..	..	..	3	1	..	33+	..	..	..	..	..	..	..	..	24	1	..	4+
..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..
14	5	4	36—	1	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	27	8	7	30—
12	3	2	25	2	..	1	..	3	..	..	..	..	..	..	..	..	..	..	..	33	12	4	36+
..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	3	2	..	67—
4	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	10	2	..	20
..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..
1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..
..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	3	..	2	..
3	..	3	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	7	..	5	..
4	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	24	12	1	50
..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	11	4	..	36+
2	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	12	1	..	8+
3	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	10	1	1	10
..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..
..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
..	..	..	..	2	..	2	..	4	1	1	25	1	1	..	100	..	..	..	..	7	2	3	29—
..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
1	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2	..	..	..
74	6	7	8+	76	2	5	3—	39	1	1	3—	1	1	..	100	..	..	..	..	305	46	18	15+
65	3	5	5—	61	..	2	..	29	2	..	7—	..	..	..	..	..	..	..	..	262	45	12	17+
139	9	12	6+	137	2	7	1+	68	3	1	4+	1	1	..	100	..	..	..	..	567	91	30	16+

Recapitulation of Report.

DISEASES.	REMAINING JAN. 1, 1896.		ADMITTED.		TOTAL TREATED.		DISCHARGED.		DIED.		REMAINING DEC. 31, 1896.	
	Adults.	Minors.	Adults.	Minors.	Adults.	Minors.	Adults.	Minors.	Adults.	Minors.	Adults.	Minors.
Small-pox	..	3	4	..	4	3	2	3	1	..	1	..
Typhus fever	..	..	2	..	2	..	2	..	..	..	..	..
Measles	5	11	163	180	168	191	163	146	3	41	2	4
Scarlet Fever	5	19	12	10	17	29	16	28	1	1	..	..
Diphtheria	..	..	1	..	1	..	1	..	..	..	..	..
Scarlet fever with diphtheria	1	3	5	51	6	54	4	25	..	20	2	9
Scarlet fever with measles	..	2	1	10	1	12	1	8	..	4	..	..
Scarlet fever with parotitis	..	..	..	1	..	1	..	1	..	..	..	..
Scarlet fever with pertussis	..	..	..	1	..	1	..	1	..	..	..	..
Scarlet fever with varicella	..	..	..	10	..	10	..	3	..	..	..	7
Measles with diphtheria	..	..	..	35	..	35	..	18	..	16	..	1
Diphtheria with pertussis	..	..	..	21	..	22	..	19	..	2	..	1
Diphtheria with pertussis and scarlet fever	..	..	..	1	..	1	..	1	..	..	..	..
Leprosy	4	..	3	..	7	..	2	..	2	..	3	..
Observation	1	1	..	..	1	1	1	1	..	..	..	..
Total patients	16	39	191	321	207	360	192	254	7	84	8	22
Accompanying	1	1	5	2	6	3	5	3	..	..	1	..
Total	57		519		576		454		91		31	

STEAMBOAT "FRANKLIN EDSON."

Number of Trips Made Each Month, 1896.

MONTH.	FROM NORTH BROTHER ISLAND TO											
	Reception Hospital, foot of E. 16th st.	Coaling Station, Brooklyn.	Blackwell's Island.	Hart's Island.	Randall's Island.	Foot of Stanton st.	Foot of E. 79th st.	Foot of E. 114th st.	Foot of E. 138th st.	Glen Cove, L. I.	Jersey City, N. J.	Total.
January	36	5	..	3	2	..	..	..	4	..	..	50
February	25	3	..	2	1	..	..	1	8	..	..	40
March	31	5	..	2	1	..	..	1	6	..	..	46
April	29	4	..	6	1	1	..	1	..	..	..	42
May	30	4	2	5	3	..	1	2	2	2	..	51
June	33	6	1	6	9	..	2	1	9	..	..	67
July	28	4	2	5	4	..	..	5	..	..	..	48
August	29	4	1	5	3	..	2	2	2	..	..	48
September	32	4	..	4	..	..	..	2	4	..	..	46
October	34	4	..	5	2	..	1	3	6	..	..	55
November	26	4	2	3	2	..	..	3	3	..	..	43
December	26	5	..	4	1	..	..	..	5	..	3	44
Total	359	52	8	50	29	1	6	21	49	2	3	580

Number of Patients Transported.

To	From								Total.
	Riverside Hospital, N. B. I.	Reception Hospital, foot of E. 16th st.	City Hospital, B. I.	Metropolitan Hospital, B. I.	Infant's Hospital, R. I.	Idiot Asylum, R. I.	House of Refuge, R. I.	Foot of E. 138th st.	
Riverside Hospital	...	504	..	..	2	1	..	6	513
Reception Hospital	452	...	1	1	..	..	2	28	484
Total	452	504	1	1	2	1	2	34	997

Number of Dead Bodies Transported.

To	From					Total.
	Riverside Hospital.	Reception Hospital.	City Hospital.	Metropolitan Hospital.	Infant's Asylum.	
Riverside Hospital	...	183	1	1	27	212
Reception Hospital	61	...	..	..	..	61
Hart's Island	242	...	..	..	..	242
Total	303	183	1	1	27	515

Respectfully submitted,
C. H. G. STEINSIECK, M. D.,
Resident Physician.

ATTORNEY AND COUNSEL.

NEW YORK, January 4, 1897.

To the Secretary of the Board of Health of the Health Department of the City of New York:

SIR—I have the honor to transmit herewith the annual report of the Attorney and Counsel for the year ending December 31, 1896:

Number of orders received for prosecution	20,379	
Number of orders pending December 31, 1895	1,053	
		21,432
Attorney's notices issued on orders received in 1896	20,379	
Other Attorney's notices	3,317	
		23,696
Nuisances abated before suit	16,889	
Orders extended or in course of prosecution	2,091	
Nuisances abated after suit brought	2,452	
		21,432
Civil Actions.		
For violation of Tenement-house law	2,594	
Actions pending December 31, 1895	223	
Judgments opened by the court	149	
		2,966

Disposition of Civil Actions.

Civil actions discontinued for cause (compliance with orders, etc.) by the Board of Health	2,405	
Judgments rendered in favor of Department	243	
Actions pending December 31, 1896	318	
		2,966

Disposition of Judgments.

Total number of judgments		243
Judgments opened by the court with costs	13	
Judgments opened by the court without costs	136	
Judgments upon which executions have been issued and transcripts filed	72	
Judgments upon which motions to open defaults are still pending, and execution stayed by the court	22	
		243

Executions issued	112
Transcripts filed	112
Judgments opened by the court	149
Judgments, criminal courts, for violation of Sanitary Ordinances	464

Moneys collected and paid to City Chamberlain in Civil Actions	$86 50
Fines imposed in criminal courts for violation of Sanitary Code	9,080 00

Fines are classified as follows:

Adulterated milk	$7,650 00	
Manure, swill, ashes, nuisance, etc	697 00	
Section 197, Sanitary Code, live fowls	290 00	
Section 32, Sanitary Code, exposing meat	130 00	
Decayed fruit	313 00	
		$9,080 00

Respectfully submitted,

HENRY STEINERT,
Attorney and Counsel.

NEW YORK, March 17, 1897.

Hon. CHARLES G. WILSON,
President Board of Health:

DEAR SIR—I have the honor to report the result of my proceedings in regard to the condemnation of rear tenements by the Board of Health, as follows: I was retained in July, 1896, to act as counsel in the litigation. At that time a motion was pending in the Supreme Court for an injunction made by Max S. Meyer against the vacation of the rear tenement at No. 83 Columbia street. The motion was argued before Judge Stover by Mr. David Keane, of Coudert Brothers, and opposed by me. Judge Stover denied the motion and handed down an opinion, a copy of which is annexed to this report. The plaintiff then discontinued his suit. A similar motion was made in the same court by Miss Josephine E. Egan to prevent the vacation of No. 59 James street. This was argued for the plaintiff by Mr. Amasa Redfield, with whom was associated Mr. Henry A. Forster, and opposed by me, before Judge Smyth. On the argument the plaintiff attacked the constitutionality of the law of 1867, which was re-enacted in section 659 of the Consolidation Act, and also the constitutionality of the amendment to the same, chapter 567 of the Laws of 1895. Judge Smyth denied the motion and sustained the constitutionality of the law upon the argument without writing any opinion. The plaintiff then appealed to the Appellate Division. The appeal was argued by Mr. Henry A. Forster for the complainant, and by me for the Board of Health, respondents. The Appellate Division affirmed the order upon the ground that the affidavits showed that the premises were a nuisance, without passing upon the constitutionality of either of the laws. The opinion is hereto annexed. The case was then tried before Judge Beekman at Special Term, by Messrs. Redfield & Forster for the plaintiff, and by me for the defendant. Judge Beekman dismissed the complaint and handed down an opinion, hereto annexed, which sustains the constitutionality of both laws in all respects. A similar action brought by Andrea Pegano and Giovanni Tasso was tried before Judge Beach by Mr. E. Ellery Anderson for the plaintiffs, and by me for the defendants. Judge Beach dismissed the complaint.

As a test case to settle the validity of the law and the practice under it, the Board of Health selected the premises known as the Mott Street Barracks, namely, the rear tenements Nos. 308, 310, 312, 314 and 316 Mott street. Condemnation proceedings were instituted and the determination as to the necessity of the destruction of the buildings was referred by consent to Mr. William G. Davies, by Judge Beekman. After a protracted trial, in which the owner of the buildings, Mr. Frederick Dassori, was represented by Messrs. Coudert Bros., for whom Mr. David Keane acted as counsel, Mr. Davies reported in favor of the destruction of the buildings. Upon his report a judgment was entered appointing commissioners to determine the value of the buildings. They have not yet made their report; but they intimated upon the argument that they would assess the value of the buildings at no more than the value of the materials, namely $110. Messrs. Coudert Brothers had announced their intention to take an appeal.

Suits which have not yet been tried have also been brought against the Board of Health by the owners of several other rear tenements situated on Cherry street and Roosevelt street. A condemnation proceeding has been instituted to condemn the rear buildings at Nos. 32 and 34 Cherry street and the entire tenement houses at Nos. 36–38 Cherry street and No. 81 Roosevelt street. The owners, lessee and mortgagee of the buildings have filed answers disputing the necessity of the condemnation and the constitutionality of the act. These issues will be tried by Judge Beekman on the 25th instant.

On account of the voluntary destruction of other buildings which formerly impeded its ventilation, I have recommended the Board to revoke its orders for the destruction of No. 109 Thompson street upon the release by the owner of all claims for damages on account of the proceedings by the Board and under its authority, and upon his making certain improvements which will remedy the present sanitary evils. After considerable negotiation with the owner, Mr. Thomas Halstead, he has agreed to this. Of the other buildings condemned, the owners of Nos. 127 West Third street, 105 Thompson street, 211 West Twenty-eighth street, 146 to 150 Eighth avenue and 68 to 74 Thompson street, have accepted the amounts offered them for their buildings by the Board of Health, which in no case exceeded three hundred dollars, which latter sum includes all four buildings Nos. 68, 70, 72 and 74 Thompson street, and have agreed, upon the receipt of that amount, that the buildings may be destroyed. The owners of Nos. 260 West Houston street and 88 and 90 Catharine street, 78 and 80 Essex street, 326 East Eleventh street and 246, 248, 250 and 254 Mott street have voluntarily destroyed their buildings. The owners of Nos. 20 Mott street and 105 and 107 Washington street have ceased to use them as tenement houses, and have altered them into warehouses or for other business purposes. There remain, consequently, thirty-four buildings concerning which condemnation proceedings remain to be instituted.

The Attorney and Counsel for the Board, Mr. Henry Steinert, has rendered me valuable assistance throughout the foregoing litigation. I have also been ably assisted by the Sanitary Superintendent, Dr. Charles F. Roberts.

I append to this report copies of

(1) The opinion of the Appellate Division in Egan vs. Health Department.

(2) The opinion of Judge Beekman in Egan vs. Health Department.

(3) The opinion of Judge Beach in Pegano vs. Health Department.

(4) The opinion of Judge Stover in Meyer vs. Health Department.

(5) The opinion of Mr. William G. Davies as referee in Health Department vs. Dassori.

I remain,
Yours respectfully,
ROGER FOSTER.

EGAN VS. HEALTH DEPARTMENT, 9 APP. DIV. REPORTS, P. 431.

VAN BRUNT, *P. J.*—The motion in this case does not appear to have been denied because of want of power, and, therefore, if there were facts enough shown upon the motion to justify the Court in refusing the injunction, there is no necessity for the discussion upon this appeal of the interesting constitutional questions sought to be presented. The affidavits upon the part of the plaintiff are to the effect that no pestilence or contagious disease had ever occurred in the building; that all the sinks and drains are in perfect sanitary condition and have been continually kept in that condition; that the entire plumbing and drainage of the premises are in perfect condition, and that the height of the ceilings is seven feet seven inches.

Upon the part of the defendants affidavits were offered to the effect that the sink in the yard was filthy, emitting offensive odors and sour smelling; that the cellar of the building was only five and one-half feet high and not cemented, but damp through want of ventilation; that many of the rooms of the tenement in question are ventilated from a narrow space, at the bottom of which there are accumulations of dirt and filth, which render the air foul, impure and unhealthy, and that the whole building is in a very offensive condition from dirt and vermin, is unfit for human habitation, and endangers the health of the occupants of the other houses in the vicinity.

This state of the premises in question is sought to be established by the affidavits of several persons who had examined the premises. These particular allegations are in no way met by the plaintiff, who relies entirely upon the allegations contained in her moving papers. If the premises in question were in the condition sworn to, they were a public nuisance, which the Board of Health was justified in summarily abating. Its continuance was a menace to the public health, and it is well settled that a public nuisance may be abated. (*United States Ill. Co. vs. Grant*, 55 *Hun*, 222.)

This being the condition of the proof before the Court below, it was justified in refusing to interfere, as a Court should not, even if it had power, except upon good cause shown, interfere in the measures taken by public officials to protect the public health.

If the defendant has acted without justification the plaintiff has her remedy at law, which, in this case, would seem to be entirely ample.

The order appealed for should be affirmed, with ten dollars costs and disbursements.

Barrett, Rumsay, Williams and Patterson, *J. J.*, concurred. Order affirmed, with ten dollars costs and disbursements.

ACTION FOR INJUNCTION AGAINST HEALTH DEPARTMENT OF CITY OF NEW YORK.

CONSTITUTIONALITY OF SCHEME FOR ABATING THE NUISANCE OF UNSANITARY BUILDINGS.

New York Supreme Court—Special Term, Part III., March, 1897.

Josephine E. Egan, by Luke A. Lockwood, her guardian *ad litem*, plaintiff, *vs.* The Health Department of the City of New York, defendant.

In an action to enjoin the Health Department of the City of New York from executing an order made by it, requiring the tenants of certain premises to vacate the same and prohibiting their further use as a human habitation without a written permit from the Board of Health, *Held* that the effect of such order was not to deprive the owner of her property without due process of law because she had not received notice of the proceeding, and the law under which the Board proceeded did not entitle her to notice, as such a determination of the health authorities is not final and conclusive, but is always open to judicial inquiry and review, even though the owner may have had a hearing before the Board on the subject.

The order is not unreasonable because it prohibits the use of premises as a human habitation in the future without written permission of the Board. Such an order applies to existing conditions, and it must be assumed that upon abatement of the nuisance the Board would grant the permission; indeed, it could not legally withhold it.

The provisions of section 659 of the Consolidation Act, as amended by chapter 567 of the Laws of 1895, discussed, and *Held* that the scheme therein provided for the abatement of the nuisance of unsanitary buildings is not unconstitutional, and that the Court will refrain from interfering with its operation except in cases where an abuse of authority is manifest.

Redfield & Redfield and Henry A. Forster for plaintiff; Henry Steinert and Roger Foster for defendant.

BEEKMAN, *J.*—The plaintiff is the owner of a tenement house situated on the rear portion of the premises No. 55 James street, in this city, and in this action seeks to enjoin the Health Department from executing an order which it has made requiring the tenants to vacate the premises and prohibiting the further use of the same as a human habitation without a written permit from the Board of Health, which is the head of the Department. The order recites that the sanitary superintendent, one of the defendant's officers, has certified to the Board that the building in question is "unfit and not reasonably capable of being made fit, for human habitation, by reason of want of proper ventilation and by reason of want of repair and defects in the drainage and plumbing and because of the existence of a nuisance on the premises which is likely to cause sickness among its occupants, and that the occupancy of said building is dangerous to life and detrimental to health." This condition the Board has determined to exist, and states it as the reason for issuing the order complained of. Much proof was taken upon the trial with respect to the sufficiency of these charges, and while perhaps it may not be necessary for me to go further than to find that there was some basis for an exercise of judgment upon the situation by the Board, and that the conclusion arrived at was neither unreasonable nor unsupported by the facts, it is proper to add that I concur in the propriety of the action which was taken. The unsanitary condition of the building was obvious; the facts had been reported to the Board by its officers who were charged with the duty of personal inspection, and at least two of the commissioners had themselves personally examined the property.

It was the function of the Board, exclusively confided to it by the Legislature, to determine whether an occasion existed for the exercise of the power set in motion by its order, and having so determined, the Court will not assume to reverse its action, unless it appears that such action has been arbitrary, oppressive or repugnant to justice. The plaintiff contends, however, that she was entitled to notice of the proceedings, and to be heard upon the question before it was found against her, and that, as she had neither, she has been deprived of her property without due process of law in violation of constitutional guaranty, and is, therefore, entitled to the protection of the Court against an unwarrantable invasion of her right. This claim, however, is unsupported by authority (Health Department vs. Rector, etc., 145 N. Y., 32; Peo. ex rel. Copcutt vs. Board of Health, 140 N. Y., 1; Fire Department vs. Gilmore, 149 N. Y., 453, 459). It rests upon the mistaken assumption that the determination of the health authorities is final and conclusive. The jurisdiction of the Board depends upon the existence of the nuisance, and that is always open to judicial inquiry, even though the property owner may have had a hearing before the Board on the subject (Health Department vs. Rector, *supra*, p. 48, where the whole subject is elaborately discussed). Even the action under which the defendant proceeded in this case does not assume to do more than to declare that the orders of the Health Board are to be treated as "*prima facie* just and legal." While the judgment of the Board upon the question is entitled to great weight, and will not be disturbed if it is within the bounds of reason, its reasonableness is still open to inquiry in any judicial proceeding, either civil or criminal, in which it may be called in question. But where sufficient grounds exist for action, the latter may be summary and without "due process of law," as that phrase is commonly understood (Lawton vs. Steele, 119 N. Y., 226).

In the case cited the Court, after reviewing the cases upon the subject, says (p. 237): "These authorities sufficiently establish the proposition that the constitutional guaranty does not take away the common law right of abatement of nuisances by summary proceedings without judicial trial or process."

But it is claimed that the order is unreasonable in that it not only requires the building to be vacated, but also prohibits its use as a human habitation at any future time without written permission of the Board; so that, even if the plaintiff should remedy the evils which the Board has found to exist, and should restore the premises to a sanitary condition, she would still be prevented from enjoying her property. The answer to this seems to be that the order is to be construed as applying to then existing conditions. It will be time enough to consider what the rights of the plaintiff may be when she has removed all present grounds for complaint. She would then be in a position to apply for the permission which the order contemplates, and, if the nuisance has been abated, it must be assumed that the Board would grant it. Indeed, it could not legally withhold it. The statute (section 659 of the Consolidation Act) under which the order in question was made provides that the Board may revoke the order whenever it "shall become satisfied that the danger from said building or part thereof has ceased to exist, or that said building has been repaired so as to be habitable." It could not capriciously or unreasonably refuse to be satisfied where the facts plainly demand such a conclusion. Although the words which confer the power to revoke are permissive in form, they import, under well settled rules, an obligation to exercise such power when the justice of the case demands it. In other words, the deprivation of which the plaintiff complains continues only so long as the conditions exist which justified the order in the first instance, and the plaintiff, therefore, is not aggrieved, on constitutional or other grounds, by the operation of repressive measures essential to the abatement of the nuisance, for such repression can continue only so long as the occasion for it exists.

It is in evidence that shortly after the passage of the order in question a further order or resolution was passed by the Board of Health condemning the premises and requiring the owner forthwith to remove the building. A preamble recites the previous order, declares that the premises are dangerous to life or injurious to health, and that "the evils in or caused by said building or premises cannot be remedied by repairs or in any other way except by destruction." Authority for this is found in chapter 567 of the Laws of 1895, amending section 659 of the Consolidation Act. An examination of the statute, however, very clearly shows that this order is an initiatory step, which must be followed by proceedings in Court for the condemnation of the property and the award of compensation therefor. Where the Board has determined that a destruction of the building is necessary, the act provides that said Board of Health may condemn the same and order it removed, provided the owner or owners of said building can demand a survey of said building in the manner provided for in case of unsafe buildings, and may institute proceedings in the Supreme Court in the County of New York for the condemnation of said building." The owner is expressly allowed to answer the petition of the Board in such proceedings and to dispute the necessity for the order. If upon the trial the order is sustained, commissioners must then be appointed by the Court to estimate and determine the compensation which the owner shall be entitled to receive for the destruction of his property.

It will thus be seen that the plain purpose of the statute is that where condemnation is determined upon by the Board, compensation must be made to the non-assenting property owner. The order or resolution of the Board condemning the property must therefore in such a case be followed by the institution of proceedings to condemn, for it is the only method by which it can be made effective. The property owner also has a pecuniary interest in the matter, which is sufficient to make the exercise of the power obligatory and enforceable at his suit. The permissive form in which the power is stated in the act is such as is commonly used in conferring jurisdiction, and does not mean that the Board may or may not act at its mere discretion. Power thus conferred becomes imperative when a case is presented where either the public interests or the protection of a private right calls for its exercise. This is a well settled principle of statutory construction. The statute then develops a perfectly clear and constitutional scheme for the abatement of nuisances of this class. The first step is the order such as was made in the first instance in this case. It is injunctive in form, and in contemplation of law suspends the occupation of the property while the grounds for complaint exist. The owner may remedy the evil, and when he shall have done so he will be relieved from the order. Should this not be done or be impossible, the Board may follow up the first order by a second one, which by statute is predicated upon the former, declaring the mischief irremediable and condemning the building. Where the owner does not assent to the removal, the Board must avail itself of the remedy by which the condemnation is legally accomplished, and the amount of compensation to be made to the property owner is ascertained, and in that proceeding the existence of the jurisdictional facts, namely, "the necessity of such destruction," must be tried and determined on the demand of the owner.

We have thus, when the action of the Board is to be conclusive upon the rights of the owner, ample provision for such notice and a judicial hearing before such action becomes final; and if the decision of the Court is adverse to the Board, the property owner is free from the operation of the second order, and, as we have seen, may disburden himself of the first by remedying whatever evils may justify its continuance.

As the power conferred upon the Board is necessary for the protection of the public health, and must therefore be susceptible of immediate and untrammeled exercise, as the exigency of the case may require, the statute is quite as considerate of private right as it should be, and fully meets the demand of justice. It is clearly constitutional, and the Court will refrain from interfering with its operation except in cases where an abuse of authority is manifest.

Judgment is ordered for the defendant, dismissing the complaint, with costs.

MEYER VS. HEALTH DEPARTMENT OF NEW YORK.

By STOVER, *J.*—This is an action to restrain the Board of Health from interfering with the premises of the plaintiff, under the provisions of chapter 567 of the Laws of 1895, being an amendment of the Consolidation Act. The Board of Health have taken all the requisite steps under the statute, and contemplate the condemnation of the property and for the vacation of the premises for sanitary reasons, and the time allowed for the compliance with the order has expired. Upon the argument of the motion it is conceded that the act is a constitutional one, but the Court is asked to interfere for the reason that the premises are not in an unsanitary condition, nor are they dangerous to life. And in support of this the affidavits of numerous parties, experts and otherwise, are submitted. I think the motion for a preliminary injunction must be denied. Under the statute the Board of Health is constituted the authority to pass upon the condition of the property and to determine the questions with regard to the sanitary condition. In doing this they are performing a judicial act, and that act ought not to be interfered with by the injunction of this Court, unless it clearly appears that they are without jurisdiction. An examination of the papers in this case shows a condition calling for a fair exercise of judgment, and it does not appear that the conclusion and determination of the Health Department was not one fairly deducible from the evidence. This statute is one to be enforced under the police powers of the State, and while some of its features appear to be arbitrary, and the proceeding summary, yet with the provision for compensation, and with the rights of property owners so well guarded, no lasting or irreparable detriment can come to the property owner; and the public health demands that the provisions of the law should in cases where once determined they apply be summarily and rigidly enforced. If, however, an appeal to the Courts is to be taken in each instance, and a hearing to be had as to whether or not the premises are in a condition to justify the action of the Board, the Court becomes the arbiter of the question, and the object of the statute is defeated. It was the intention of the statute to place all responsibility of the inspection and adjudication as to the condition of the premises with the Board of Health; and, so long as they have facts sufficient to give them jurisdiction, the Court will not interfere, even although upon the same state of facts, if it were the proper judge of the circumstances, it might come to a different conclusion from that arrived at by the Board of Health. For the above reasons the motion for the injunction must be denied.

SUPREME COURT—SPECIAL TERM, PART III. PAGANO VS. HEALTH DEPARTMENT.

The New York Law Journal, March 29, 1897.

A decree is entered for the defendant dismissing the complaint, with costs, upon the decision of Justice Beekman in the case of Egan vs. same defendant (Law Journal, March 19, 1897).

SUPREME COURT.

NEW YORK COUNTY.

In the matter of the application of the Health Department of the City of New York, plaintiff, against Frederick Dassori, the Greenwood Cemetery and Pietro Rosa, relative to condemnation of rear buildings at premises known as Nos. 308, 310, 312, 314 and 316 Mott street, in the City of New York, defendants.

Roger Foster, Esq., and Henry Steinert, Esq., for the plaintiff. David Keane, Esq., and Messrs. Coudert Bros. for the defendant, Dassori. Before William G. Davies, Esq., Referee.

This is an action brought by the Health Department of the City of New York, pursuant to the provisions of chapter 567 of the Laws of 1895, to compel the owner of rear buildings on the premises known as Nos. 308 to 316 Mott street, in the City of New York, to remove the same. The specific provision under which the action is brought reads as follows, being part of section 659 of the statute cited :

"Whenever, in the opinion of the board of health of the health department of the city of New York, any building or part thereof in the city of New York, an order to vacate which has been made by said board, is by reason of age, defects in drainage, plumbing, infection with contagious diseases, or ventilation, or because of the existence of a nuisance on the premises, which is likely to cause sickness among its occupants, or among the occupants of other property in the city of New York, or because it stops ventilation in other buildings, or otherwise makes or conduces to make other buildings adjacent to the same unfit for human habitation, or dangerous or injurious to health ; or because it prevents proper measures from being carried into effect for remedying any nuisance injurious to health or other sanitary evils in respect of such other buildings ; so unfit for human habitation that the evils in or caused by said building cannot be remedied by repairs, or in any other way except by the destruction of said building, or of a portion of the same, said board of health may condemn the same and order it removed, provided the owner or owners of said building can demand a survey of said building in the manner provided for in case of unsafe buildings, and may institute proceedings in the supreme court in the county of New York for the condemnation of said building. Said proceedings shall be instituted and carried on in the manner prescribed by the code of civil procedure, except as modified by this act. Upon the institution of said proceedings, the owner of said building or any person interested therein may in his answer dispute the necessity of the destruction of said building or part thereof as the case may be. In such case, the court shall not appoint commissioners unless proof is made of the necessity of said destruction. In such proceeding evidence shall be receivable by the commissioners to prove :

* * * * * * * * * * * * * * *

3. That the building is unfit, and not reasonably capable of being made fit for human habitation; and if the commissioners are satisfied by such evidence, then the compensation—

* * * * * * * * * * * * * * *

(c) Shall in the third case be the value of the materials of the buildings."

Pursuant to the authority thus conferred the Board of Health on June 2, 1896, adopted a resolution condemning the property in question (S. M., p. 6). On the ninth of September, 1896, these proceedings were commenced and by an order made and entered on October 13, 1896, the issues raised by the petition and answers were referred to me to hear and determine. Neither of the defendants, the Greenwood Cemetery, a mortgagee, or Pietro Rosa, a lessee, appeared on such reference.

The answer of the defendant Dassori among other things denies that the buildings and premises are not fit for human habitation by reason of want of proper ventilation, age, defects in drainage and plumbing, or because of buildings adjacent thereto, or because of the existence of a nuisance on the premises which is likely to cause sickness among its occupants or among the occupants of adjacent buildings ; denies that the buildings and premises make or conduce to make the buildings adjacent thereto unfit for human habitation, and denies that the buildings and premises are not reasonably capable of being made fit for human habitation and occupancy, or that the evils in or caused by said building and premises cannot be remedied by repairs or in any other way except by the destruction thereof. The said defendant also denies that the said provisions of chapter 567 of the Laws of 1895 have any legal force or virtue, and avers that the same are null and void and of no legal effect, and confer upon the plaintiff no power, right or authority whatsoever, and that they are repugnant to and in violation of the provisions of the Constitution of the United States, and of the Constitution of the State of New York, whereby the plaintiff is guaranteed that his property shall not be taken except by due process of law and upon just compensation.

At the opening of the reference before me a motion was made to dismiss the petition on the grounds :

1st. That the Court had no jurisdiction, inasmuch as it appeared by the pleadings that no attempt had been made in good faith to agree with the property owner upon a price for his property.

2d. That chapter 567 of the Laws of 1895 is unconstitutional and void for reasons stated.

3d. That the petition does not state sufficient facts to entitle the plaintiff to any relief.

4th. That the petition does not show that the plaintiff has made any *bona fide* offer to agree with the defendant for the purchase of the property sought to be condemned.

The motion was denied because the petition does, in my opinion, state facts sufficient to bring the case within the provisions of the statute, and the pleadings show that such compensation was offered as the statute requires ; and further, because, occupying a position analogous to that of a Judge at Special Term, I did not feel at liberty to question the constitutionality of a statute duly enacted by the Legislature of the State. I therefore assume the validity of the law without expressing any opinion upon this question.

The plaintiff thereupon proceeded to offer testimony in support of its case, and at its close the defendant Dassori again moved to dismiss the petition, on the grounds :

1st. That the plaintiff had not proved that the rear tenements (Nos. 308 to 316 Mott street) are unfit for human habitation.

2d. That the plaintiff had not proved that they cannot be made fit for human habitation.

3d. That no attempt had been made in good faith to purchase the property from the owner.

To properly dispose of this motion requires an examination of the testimony to show what was actually proved.

The premises in question consist of a parcel of land on the easterly side of Mott street, in the City of New York, between Bleecker and Houston streets, about ninety-one (91) feet in front by sixty-one feet five inches (61.5) in depth. Upon this land there stand five houses in front, each fifty (50) feet in height, and three in the rear, each fifty-three (53) feet in height, the entire plot being covered with the exception of a court-yard between the front and rear buildings, which is five (5) feet in width at the northern extremity and seven (7) feet in width at the southern end. The apartments in the rear buildings each consist of three rooms; the front one, the living room, being each lighted and ventilated by two windows each five (5) feet by three (3) opening into the court yard, and two bedrooms in the rear, each lighted and ventilated by one window two (2) feet square. In the northerly line of rooms this window on each story opens into the yard of adjoining property, but the window in each other room looks upon a blank wall at an average distance of eight (8) inches from it. (See testimony of W. D. Gardner and diagram Ex. K., October 28, 1896.) The cellar of these rear buildings is occupied by the water-closets for the use of all the tenants in both the front and rear buildings, and this cellar is open into the court-yard, having no other means of ventilation (S. M., pp. 69, 70). The floor of the cellar being level with the pavement of the court-yard and all the doors and windows opening into it on the level of the first story, at least seven feet above it (S. M., p. 90), there results a well through which no current of air ever flows, which is constantly fed with emanations from the closets and dampness arising from the hydrants in the court. (S. M., 137, *et seq.*) It naturally follows that the atmosphere of both buildings is permeated by these exhalations. (S. M., 46, *et seq.*) In this condition of affairs, the expert testimony introduced to show lack of ventilation, and the injurious effect of the surroundings upon the health of the tenants, was scarcely necessary, and it is not surprising that the records of the Health Department should show an excessive death-rate in these buildings, being forty-five eight-seven hundredths (45.87) to the thousand, as compared with the average death-rate of the city of about twenty-four (24) to the thousand (S. M., p. 103) for the past six years. (S. M., p. 232.)

It does not appear from the records whether these deaths occurred in the front or rear buildings, but the fact is immaterial as, conceding them all to have occurred in the front buildings, the evidence would tend to sustain the contention of the plaintiff that the rear buildings prevent proper ventilation of buildings adjacent thereto.

The general dilapidation of the buildings, the presence of vermin, the filthy condition of the premises, as shown by the testimony, are perhaps susceptible of improvement, and are doubtless due in large measure, as claimed by the defendant, to the habits of the tenants, who are of the lowest class of Italian immigrants, but the horrible school sinks are a pestilent nuisance and menace to health which appears to be irremediable. (S. M., 184 *et passim.*) The filthiness and squalor of these poor people does not relieve the authorities from the duty to protect them even against themselves, and to provide them, so far as possible, with surroundings which shall not be inimical to their physical well being.

The foregoing considerations lead me to deny the motion to dismiss the complaint on the first two grounds stated. As regards the third, the statute provides that if the building is unfit, and not reasonably capable of being made fit for human habitation, the compensation to the owner shall be the value of the materials of the building. In my opinion the plaintiff has made a *prima facie* case bringing the building within this requirement, and the evidence shows that this value is one hundred and ten ($110) dollars (S. M., 112), and that this sum was offered to the owner by the plaintiff (S. M., 20).

The motion to dismiss the complaint is therefore denied.

NEW YORK, December 24, 1896.

(Signed) WILLIAM G. DAVIES,
Referee.

HEALTH DEPARTMENT,
NEW YORK, February 1, 1897.

CHARLES G. WILSON,
President:

SIR—I have the honor to submit the following report upon the vital statistics of 1896:

There were 41,652 deaths, 55,623 births and 20,513 marriages reported during the year, representing an increase of 1,892 births and a decrease of 1,767 deaths and 99 marriages, when compared with the number reported in 1895.

DEATHS.

The actual number of deaths was 41,622, against 43,420 in 1895, showing a decrease of 1,798, and representing a death-rate of 21.52 on an estimated population of 1,934,077, against a rate of 23.11 in 1895, on an estimated population of 1,879,195.

The distribution of this decrease of 1,798 deaths is indicated by the following comparative table of the number of deaths under the various classified headings for 1895 and 1896:

CLASS OF DISEASE.	1895.	1896.	INCREASE.	DECREASE.
Miasmatic	4,503	3,697	....	806
Diarrheal	3,208	2,874	....	334
Malarial	90	112	22	....
Zoögenous	4	....	....	4
Syphilitic	109	137	28	....
Septic	416	389	....	27
Other zymotic	....	3	3	....
Parasitic	22	10	....	12
Dietetic	258	367	109	....
Constitutional	7,784	7,483	....	301
Developmental	1,857	1,996	139	....
Nervous	3,429	3,359	....	70
Organs special sense	70	70	....	....
Circulatory	2,488	2,567	79	....
Respiratory	8,514	7,452	....	1,062
Digestive	3,181	3,040	....	141
Lymphatic, etc.	17	26	9	....
Urinary	2,901	2,903	2	....
Generative	83	81	....	2
Parturition	191	218	27	....
Locomotory	107	76	....	31
Integumentary	94	91	....	3
Accidental	2,045	2,641	596	....
Homicide	76	71	....	5
Suicide	376	384	8	....
Ill-defined	1,597	1,575	....	22
Total	43,420	41,622	1,022	2,820
Balance	1,798		1,798	

It will be observed that the items of decrease are chiefly among the miasmatic or specific febrile diseases, the diarrheal diseases, the constitutional diseases and diseases of the respiratory organs, while the chief increase is among the accidental deaths. The less important, but still noticeable, items of increase are among the dietetic and developmental classes of disease. The excess of 109 in the former is almost entirely due to an increase of deaths from alcoholism, which numbered 252 in 1895, and 360 in 1896, an increase of 108. The excess of 139 in the developmental class was almost altogether due to an excess of premature births and of deaths from old age, which together amounted to 1,361 in 1895 and 1,475 in 1896, an increase of 114. A detailed examination of the diseases showing a decreased number of deaths follows.

Miasmatic (*Specific Febrile*) *Diseases*—The diseases of this class which exhibit any important decrease, in a comparison of the two years, are given in the following table:

CAUSE OF DEATH.	1895.	1896.	INCREASE.	DECREASE.
Measles	793	714	......	79
Scarlet fever	468	402	......	66
Diphtheria	1,634	1,555	......	79
Whooping cough	496	435	......	61
Typhoid fever	322	297	......	25
Influenza	567	101	......	466
Cerebro-spinal meningitis	204	178	......	26
Total	4,484	3,682	......	802

Of the diseases included in this class those given in the table account for 802 of the 806 decrease. Every one of the important diseases of the preventable class thus showed a decrease, although considerably more than one-half of the total was due to the influenza.

The decrease in the mortality of diphtheria has been steady since the introduction of the antitoxin treatment, and has really been greater than would appear from the diphtheria heading alone, for many cases formerly reported as croup have been latterly transferred to diphtheria. If the deaths from diphtheria and croup are counted together, the record of deaths runs as follows:

CAUSE OF DEATH.	1893.	1894.	1895.	1896.
Diphtheria	1,970	2,359	1,634	1,555
Croup	588	511	342	208
Total	2,558	2,870	1,976	1,763

The deaths from typhoid fever numbered only 297, against 322 in 1895, 326 in 1894 and 381 in 1893. There has been a gradual decrease in this disease since 1883, when the number of deaths was 625, the highest recorded since 1866. Only twice before since the latter year has the number fallen below 300, viz., 251 in 1871 and 268 in 1879. Probably the greater attention paid to the sanitation of rural districts and summer resorts in recent years has had something to do with this decrease.

Diarrheal Diseases—The deaths from diarrheal diseases continue to decrease in number from year to year, owing to the improved sanitary condition of dwellings and streets, and the strict supervision of the milk and other food supplies that are brought into the city. The decrease for 1896, as compared with 1895, was 334. The deaths of this class reached their highest point in 1872, when there were 5,197 deaths in a population about half as large as the present, The number in 1896, 2,874, is the lowest on record since the organization of the Health Department in 1866.

Constitutional Diseases—The decrease in this class was almost entirely among the diseases comprised in the following table:

	1895.	1896.	INCREASE.	DECREASE.
Rheumatism	172	133	....	39
Cancer	1,030	1,141	111	....
Phthisis	5,205	4,994	....	211
Other tuberculous diseases	1,078	932	....	146
Anæmia, etc	56	52	....	4
Diabetes	203	214	11	....
	7,744	7,466	122	400

These diseases, it will be seen, account for 278 out of the total decrease in this class of 301. It is evident at a glance that the most of this decrease is in tuberculous diseases, which have been diminishing gradually for several years.

Diseases of the Respiratory Organs—Of the 1,062 fewer deaths in this class, the greater portion of the decrease was distributed among the diseases given in the following table:

	1895.	1896.	INCREASE.	DECREASE.
Croup	342	208	......	134
Emphysema, etc	105	78	......	27
Bronchitis	1,920	1,477	......	443
Pneumonia	5,751	5,383	......	368
Pleurisy	123	94	.....	29
Congestion of lungs	67	40	......	27
	8,308	7,280	......	1,028

If the deaths from croup and emphysema, etc., be omitted from the list, it will be seen that the greater part of the decrease in this class is among acute inflammations of the lungs, and is probably due to the greatly diminished prevalence of the influenza.

Accidental Deaths—The excess of 596 accidental deaths in 1896 was entirely due to the unprecedented number of deaths from sunstroke, the greater part of which occurred in a single week of August. The meteorological conditions of that period of intense heat were so extraordinary and their effect upon the mortality so striking as to call for somewhat detailed consideration.

The deaths from sunstroke during the year numbered 765, against 85 for 1895, an increase of 680. Of this total, 671 occurred in one week and 52 during the weeks immediately before and after, making a total of 723 during the three weeks covering the extremely hot period. This is more than twice the number ever recorded in this city in previous years. The next highest number for any one year is 320, which occurred in 1872 and 1892, both years with a period of intense and protracted heat in the summer. With those exceptions, the number of deaths by sunstroke has never been as high as 200 since the beginning of the century but five times, viz., 211 in 1853, 310 in 1866, 238 in 1870, 206 in 1876, and 216 in 1887.

A comparative table covering the hot periods of 1872, 1892 and 1896 is both interesting and instructive. The two weeks included in the table, extended in 1872 from June 23 to July 6, inclusive, in 1892 from July 17 to July 30, inclusive, and in 1896 from August 2 to August 15, inclusive, the number of deaths given being the actual number occurring on each day and not simply the number registered or reported:

TEMPERATURE FAHR.									HUMIDITY.			NUMBER OF DEATHS.					
MAXIMUM DURING DAY.			MINIMUM DURING NIGHT.			MEAN.			MEAN.			DAILY.			WEEKLY.		
1872.	1892.	1896.	1872.	1892.	1896.	1872.	1892.	1896.	1872.	1892.	1896.	1872.	1892.	1896.	1872.	1892.	1896.
83	76	82	64	57	70	77	66	76	78	69	65	104	146	113	807	1,092	901
73	82	86	64	61	68	68	71	76	89	67	65	119	133	98			
67	80	90	62	64	72	65	71	81	97	87	66	88	143	120			
74	83	94	65	65	76	69	74	85	94	73	61	102	151	137			
78	82	92	65	59	77	72	70	83	97	66	76	113	148	139			
88	86	97	70	65	76	80	74	85	79	78	73	118	168	122			
90	89	95	75	65	78	84	76	86	85	84	71	163	203	172			
Mean 79	82.6	90.9	66.4	62.3	73.9	72.6	71.7	81.7	88.4	74.9	68.1						
96	89	98	77	71	82	85	80	89	81	87	71	191	175	233	1,591	1,615	1,781
96	93	94	77	77	80	89	82	87	77	90	67	247	177	325			
97	96	96	76	78	81	87	84	87	83	82	70	351	199	386			
94	91	93	72	74	79	82	82	85	72	64	71	238	201	313			
95	97	90	75	75	76	84	86	82	70	68	71	227	285	234			
89	97	80	77	77	74	80	86	77	77	65	82	184	350	177			
87	86	86	70	75	74	79	80	79	64	77	73	153	228	113			
Mean 93.4	92.7	91.0	74.8	75.3	78.0	83.7	82.9	83.7	74.9	76.1	72.1						

If we take the day when the greatest number of deaths occurred as the culminating point of the period of extreme heat in each case, including in each period all days when the temperature rose to 90 degrees or more, we find that the culmination in 1872 was on the 4th day, in 1892 on the 5th day, and in 1896 on the 8th day, the greatest number of deaths on any one day being 351 in 1872, 350 in 1892 and 386 in 1896. Again, the noticeable increase in the number of deaths began on the 1st day in 1872, on the 2d day in 1892 and on the 5th day in 1896.

Whether this postponement of the fatal effect of extreme heat has been due to a difference in other meteorological conditions than heat alone, or whether it is due to an improved sanitary condition of the city, rendering the population more vigorous and more capable of resisting the morbific effects of heat, cannot be positively determined. There are, however, various reasons for supposing the latter reason to be the true one.

On further examination of the table just given, it will be seen that the mean humidity was greater during the hot period of 1872 than in either of the other years, and greater in 1892 than in 1896. A combination of high temperature and great humidity is extremely oppressive, and might be supposed to account for the difference in mortality rates. On the other hand, the minimum temperature, which is the temperature at night, was very high in 1896, much higher than in 1872 or 1892. And this seems to be sufficient to quite offset the greater humidity in those years.

Thus, the day of greatest mortality in 1872 had a temperature of 96 degrees and a mean humidity of 83, against 97 degrees and 65 respectively in 1892 and 96 degrees and 70 in 1896. The humidity for the first two days of the hot spell of 1892, on the other hand, was much higher than in 1872, being as high as 90 with a temperature of 96 degrees, and yet the mortality increased very slowly, and for the two days preceding the culmination, the humidity was low, only 64 and 68, respectively. So that it is difficult to account for the difference in the mortality in this way.

The other item in the table, already referred to, needs special mention, and that is the temperature at night. Quite equal in its depressing influence to a continuation of great heat and humidity is that of hot days with hot nights. If the nights are so warm as to interfere with sleep, there is slight opportunity for recuperation from the exhaustion of the day. A glance at the table will show a great difference in this respect for the different years. The night temperature in 1896 was not only considerably higher during the hot period, but also preceding that, the hot spells of 1872 and 1892 having each been preceded by a low temperature both day and night.

In another respect the slowness with which mortality was affected by the high temperature is shown, viz., by the number of deaths by sunstroke, or the direct effect of the intense heat. The following table gives the actual daily deaths from sunstroke during the weeks of highest mortality in 1872, 1892 and 1896, and also, for further comparison, the actual daily deaths. It must be borne in mind that Sunday in 1872 was the 2d day with a temperature of 90 or more, while in 1896 it was the 6th:

	ACTUAL DAILY NUMBER OF DEATHS.			DEATHS FROM SUNSTROKE.		
	1872.	1892.	1896.	1872.	1892.	1896.
Sunday	191	175	233	7	..	62
Monday	247	177	325	34	2	133
Tuesday	351	199	386	68	6	181
Wednesday	238	201	313	43	16	151
Thursday	227	285	234	44	50	86
Friday	184	350	177	12	106	47
Saturday	153	228	113	4	51	11
	1,591	1,615	1,781	212	231	671

Further evidence of the improved sanitary condition of the city is given in the following table. It has long been recognized that the death-rate among infants, and especially the prevalence of diarrheal diseases among them, are sensitive tests of the sanitary condition of a community.

Deaths Reported During Hottest Week.

DATE.	TOTAL DEATHS.	DEATHS OF INFANTS UNDER 1.	SAME FROM DIARRHEAL DISEASES.	PERCENTAGE.	
				Infant Deaths on Total.	Diarrheal Deaths on Total Infant Deaths.
1872	1,569	733	495	46.7	67.5
1892	1,434	563	293	39.3	52.0
1896	1,810	391	128	21.6	32.7

It will be noticed that while in 1872 nearly half of the total reported deaths were those of infants under one year of age, and of these more than two-thirds were due to diarrheal diseases, in 1896 only a little over one-fifth of the total were deaths of infants, and less than one-third of these were caused by diarrheal diseases. This surprising difference is undoubtedly due to the improvements in drainage, sewerage, and the ventilation of dwellings, and the stricter supervision of the food supply, especially milk.

To close this account of the heated term, the following table is of interest, as showing the number of deaths reported daily during the hottest week of each year, together with the weeks immediately preceding and following it:

Year.			Maximum Temperature.			Deaths Reported Daily.			Deaths Reported Weekly.		
1872.	1892.	1896.	1872.	1892.	1896.	1872.	1892.	1896.	1872.	1892.	1896.
			Degrees	Degrees	Degrees						
June 23	July 17	Aug. 2	83	76	82	115	158	78	769	1,081	809
" 24	" 18	" 3	73	82	86	102	149	112			
" 25	" 19	" 4	67	80	90	133	154	139			
" 26	" 20	" 5	74	83	94	96	164	108			
" 27	" 21	" 6	78	82	92	105	138	109			
" 28	" 22	" 7	88	86	97	117	151	131			
" 29	" 23	" 8	90	89	95	101	167	132			
June 30	July 24	Aug. 9	96	89	98	149	179	146	1,569	1,434	1,810
July 1	" 25	" 10	96	93	94	184	190	129			
" 2	" 26	" 11	97	96	96	210	187	240			
" 3	" 27	" 12	94	91	93	302	171	335			
" 4	" 28	" 13	95	97	90	267	198	374			
" 5	" 29	" 14	89	97	81	236	223	321			
" 6	" 30	" 15	87	86	86	221	286	265			
July 7	July 31	Aug. 16	87	74	85	170	302	127	1,056	1,181	822
" 8	Aug. 1	" 17	83	79	77	150	210	124			
" 9	" 2	" 18	84	73	75	157	159	151			
" 10	" 3	" 19	87	83	72	150	125	114			
" 11	" 4	" 20	89	88	72	162	107	92			
" 12	" 5	" 21	84	81	75	130	125	108			
" 13	" 6	" 22	83	85	72	137	153	106			

In contrast with 1872 and 1892, it is worthy of note that not only the mortality responded slowly to the killing heat, but that it returned so immediately to the lower level when the temperature fell. This, no doubt, is partly to be accounted for by the lateness of the season, but this favoring circumstance in 1896 is largely offset by the debilitating effects of the high temperature both day and night of the preceding week.

STREET CLEANING.

During 1895 and 1896 the streets of the city have been kept much cleaner than ever before. As the chief aim of all sanitation is cleanliness, it would seem altogether likely that this improvement in the condition of the streets would produce an appreciable effect upon the health of the population. With a view to ascertain whether such was the case the following tables have been prepared, which, although they do not demonstrate the point, are yet of sufficient interest to be inserted here.

It is presumed that if an influence were exerted toward lowering the death-rate by the improved condition of the streets, that influence would be most evident in those portions of the city where the streets had previously been in the filthiest condition. Accordingly the dirtiest and most crowded wards have been chosen for comparison with the remainder of the city. All of these wards are below Fourteenth street, and are inhabited mostly by a foreign-born population. A comparison has been made of the deaths in 1895 and 1896 with the average annual number of deaths during the preceding ten years. This average has not been increased, as customary, to correspond with the increase of population, so that it represents the deaths of a mean population much smaller than that furnishing the deaths of 1895 and 1896. There would evidently be a normal increase in the latter years, even if the death-rate remained the same, unless the population of these wards had diminished in comparison with the rest of the city. This, however, has not been the case. The population of the city, by the Police Census of 1890, about the middle of the ten-year period, was 1,710,715, of which 431,102, or 25.20 per cent., were in the selected wards, while the population of the city, by the Police Census of 1895, was 1,851,060, and of the selected wards 467,463, or 25.24 per cent., almost exactly the same.

The first table compares the total number of deaths in these divisions of the city :

Total Deaths.

PERIOD COVERED.	WARDS 1, 4, 7, 10, 11, 13, 14, 17.			REMAINDER OF CITY.			PERCENTAGE OF INCREASE OR DECREASE ON 10-YEAR AVERAGE.			
	Annual Average, 1885–1894.	1895.	1896.	Annual Average, 1885–1894.	1895.	1896.	SELECTED WARDS.		REST OF CITY.	
							1895.	1896.	1895.	1896.
First quarter	2,607	2,878	2,464	7,850	8,850	8,485	+10.4	—5.5	+12.7	+8.1
Second quarter	2,643	2,738	2,524	7,692	7,908	8,123	+3.6	—4.5	+2.8	+5.6
Third quarter	2,781	3,088	2,878	8,058	8,563	8,892	+11.0	+3.5	+6.3	+10.4
Fourth quarter	2,237	2,169	1,862	6,688	7,226	6,394	—3.0	—16.8	+8.0	—4.4
Year	10,268	10,873	9,728	30,288	32,547	31,894	+5.9	—5.3	+7.5	+5.3

The difference in the two records is very manifest, though not striking. While the remainder of the city shows an increase of deaths in 1896 over the ten-year average of five per cent., the selected wards show the same percentage of decrease.

The next table makes a similar comparison of the deaths from diarrheal diseases, as being in a special sense due to filthy surroundings, which contaminate the air and food in the vicinity.

Deaths from Diarrheal Diseases.

PERIOD COVERED.	WARDS 1, 4, 7, 10, 11, 13, 14 AND 17.			REMAINDER OF CITY.			PERCENTAGE OF INCREASE OR DECREASE ON 10-YEAR AVERAGE.			
							SELECTED WARDS.		REST OF CITY.	
	Annual Average, 1885–1894.	1895.	1896.	Annual Average, 1885–1894.	1895.	1896.	1895.	1896.	1895.	1896.
First quarter	45	41	34	115	79	122	−8.9	−24.4	−31.3	+6.1
Second quarter	157	121	154	397	327	454	−22.9	−1.9	−17.6	+14.4
Third quarter	634	621	467	1,831	1,766	1,426	−2.1	−26.3	−3.6	−22.1
Fourth quarter	78	59	46	214	194	171	−24.3	−41.0	−9.3	−20.1
Year	914	842	701	2,557	2,366	2,173	−7.9	−23.3	−7.5	−15.0

Here the difference is quite as striking, if not more so, than in the first table, the percentage of decrease in the selected wards being much greater than in the remainder of the city.

OTHER ACCIDENTAL DEATHS.

The deaths by accident, excluding sunstroke and surgical operations, were 1,346, against 1,444 in 1895, 1,299 in 1894, 1,329 in 1893, and 1,299 in 1892, showing a gradual increase from year to year not at all disproportionate to the increase of population. A matter of especial interest in the list is the number of deaths caused by the cable cars in the streets. These amounted to 14 in 1893, 10 in 1894, 21 in 1895, and 29 in 1896, of which the Broadway line contributed 12 in 1893, 2 in 1894, 5 in 1895, and 3 in 1896.

SUICIDES.

The total number of suicides for the year was 384, against 376 in 1895, 331 in 1894, and 314 in 1893. This constant and unusually large annual increase is undoubtedly to be attributed to the financial depression, which has thrown so many persons out of employment and made them despair of the future. The Germans, as usual, furnish about one-third of the whole, 126 out of 384, and their favorite methods were shooting and hanging.

AGE.

The deaths of children under five years of age numbered only 16,807, or 40.4 per cent. of the total number of deaths, against 18,221, constituting 41.9 per cent. of the total, in 1895. This is the lowest percentage ever attained, and constitutes of itself an abundant demonstration of the great improvement in late years of the sanitary condition of the city. The following table gives a comparison of the deaths, according to age, in 1895 and 1896:

YEAR.	UNDER 5.	5–15.	15–25.	25–45.	45–65.	65 AND OVER	TOTAL.
1895	18,221	1,568	2,570	8,968	7,495	4,598	43,420
1896	16,807	1,546	2,473	8,791	7,536	4,469	41,622
Decrease	1,414	22	97	177	.....	129	1,798
Increase	.....	.....	.....	.....	41	.....	.....

Thus it appears that nearly 80 per cent. of the total decrease in 1896, as compared with 1895, was among children under five years of age.

BIRTHS AND MARRIAGES.

There were 55,623 births reported during the year, representing a birth-rate of 28.78, against 53,731 in 1895 and 55,636 in 1894, being an increase of 1,892 over 1895 and a decrease of 13, as compared with 1894. It is possible that this temporary decrease is connected with the decreased marriage rate of the two previous years.

Of the total number of births, 30,284, or 54.44 per cent., were reported by physicians, and 25,339, or 45.56 per cent., by midwives. There has been a gradual increase from year to year in the proportion reported by physicians, it having been 50.48 in 1892, 52.31 in 1893, 53.55 in 1894 and 53.76 in 1895. The total number of births reported in 1894 was almost exactly the same as in 1896, viz., 55,636 against 55,623, yet in the former year only 29,765 were reported by physicians, as compared with 30,284 in 1896. So that there was an increase of 519 in the births reported by physicians and a corresponding decrease of 532 in the births reported by midwives. This seems to confirm the opinion expressed in the report for 1894, that physicians are complying with the law in this respect more generally than in former years.

The proportion of male to female births was 1.032, against 1.054 in 1895 and 1.039 in 1894. There were 419 pairs of twins reported, about one in every 133 births. 1,092 were illegitimate, nearly two per cent.

This year, for the first time, the births have been tabulated by wards, and the following table shows the birth-rate by wards, based upon the population as given by the Police Census of 1895. It will be observed that the birth-rate is extremely high in the wards inhabited mainly or largely by Russian Jews, so high as to indicate great fecundity on the part of this race, or else an enormous and hitherto unexpected increase of population in them. The latter is not at all probable, for the death-rate has perceptibly diminished.

WARD.	BIRTH-RATE PER 1,000.	WARD.	BIRTH-RATE PER 1,000.	WARD.	BIRTH-RATE PER 1,000.
1..........	25.8	9.......	35.5	17........	41.7
2..........	11.6	10........	46.9	18........	26.9
3.........	7.0	11........	29.2	19........	27.2
4..........	16.2	12........	28.2	20........	27.6
5..........	22.2	13........	60.5	21........	18.8
6..........	28.8	14........	38.7	22........	23.7
7..........	37.9	15........	22.7	23........	27.7
8..........	24.5	16........	21.9	24........	29.5

The high birth-rates in the tenement-house districts, and the low rates in the wards containing a large proportion of the more prosperous classes, make a noticeable contrast, and although mainly due to the well-known fact that the birth-rate is always highest among the poor, is in this city probably partly due to a neglect of physicians who attend the wealthier people to report the births that do occur in their practice.

MARRIAGES.

There were 20,513 marriages reported during the year against 20,612 in 1895, and 17,388 in 1894. The marriage-rate was 10.61 marriages, or 21.22 persons married per 1,000 of the population, which is a very high rate.

Two white men married colored women, and 18 white women took colored husbands. There was 1 marriage in which both parties were Chinese and 1 in which both were Japanese. 1 Japanese and 11 Chinese took white brides, and 1 white man a Japanese bride.

SEARCHES AND TRANSCRIPTS.

The number of searches made and transcripts issued was 14,884 and 13,435 respectively, against 15,417 and 12,280 in 1895, making a decrease of 533 searches and an increase of 1,155 transcripts. The decrease in the searches was in the births and deaths, 24 and 746 respectively, while there was an increase of 237 in the searches for records of marriages. The increase in the number of transcripts issued was made up as follows: 126 births, 188 marriages and 841 deaths.

Respectfully submitted,

ROGER S. TRACY, M. D.,
Register of Records.

YEAR ENDING DECEMBER 31, 1896.	CERTIFICATES RECEIVED AND TABULATED.	INCREASE OVER PREVIOUS YEAR.	DECREASE FROM PREVIOUS YEAR.
Marriages	20,513	....	99
Births	55,623	1,892	....
Deaths	41,652	....	1,767
Still-births	3,542	70	....

Places where Deaths Occurred during

Institutions	10,825
Tenement-houses, three families or more	25,375
Dwellings with less than three families	4,238

Particulars Regarding Births, Deaths, Marriages and Still-

	TOTAL.	WHITE.		COLORED.		NATIVE PARENTS.		FOREIGN PARENTS.		PARENTAGE OF MIXED NATIVITIES.		PARENTAGE UNKNOWN OR NOT STATED.	
		M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
Marriages	20,513	20,060	20,081	453	432	....	....	....	....	....	....	....	....
Births	55,623	27,861	27,011	383	368	6,746	6,529	17,305	16,858	3,866	3,658	327	334
Deaths	41,652	22,008	18,500	595	549	4,018	3,499	13,438	11,640	2,713	2,395	2,434	1,515
* Still-births	3,542	1,997	1,410	59	35	503	384	1,204	810	238	168	111	83

* Sex undetermined, 41.

VITAL STATISTICS.

Rate per 1,000, Population Estimated at 1,934,077.	Burial Permits Issued.	Transit Permits Issued.	Coroners' Cases.	Searches Made.	Transcripts Issued.	Indexed.
10.61	....	....	....	2,348	1,215	20,513
28.76	....	....	....	1,897	1,082	55,623
21.54	41,652	631	5,295	10,639	11,138	41,652
18.31	3,542	....		....	....	3,542

Year 1896 (*Actual Number of Deaths*).

Hotels and boarding-houses	481
Elsewhere	753
Total	41,622

births Reported for Year Ending December 31, 1896.

Single.		Married.		Widowed.		Not Stated.		Non-Residents.	The Returns of Births, Marriages and Still-births are Incomplete.										
M.	F.	M.	F.	M.	F.	M.	F.		Month of utero-gestation.										
18,064	18,416	....	....	2,449	2,097	...	...	...	1	2	3	4	5	6	7	8	9	10	Not Stated.
....	....	....	....	....	....	...	...	...											
14,079	10,652	6,388	4,769	1,777	3,559	359	69	477											
....	....	....	....	....	....	...	...	...	..	17	65	144	266	402	541	506	1,590	7	4

Deaths of Males by Age and Cause of Death, with the Total of both Sexes, for the Year ending December 31, 1896.

CAUSE OF DEATH.	Total of Both Sexes.	All Ages.	0	1	2	3	4	Total Under 5.	5	10	15	20	25	35	45	55	65	75	85	Colored.
I.—SPECIFIC FEBRILE (ZYMOTIC) DISEASES.																				
Miasmatic.																				
Small-pox	1	1	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..
Chicken-pox	6	5	1	3	1	..	..	5	..	..	..	..	..	..	..	..	..	..	..	..
Measles	714	355	99	119	69	30	19	336	15	1	1	1	..	1	..	..	..	..	..	6
Scarlet fever	402	203	8	34	54	32	20	148	53	..	..	..	1	1	..	..	..	..	..	..
Diphtheria	1,555	768	87	197	169	88	93	634	107	11	1	1	7	4	3	..	..	..	..	11
Mumps	5	3	2	..	1	..	..	3	..	..	..	..	..	..	..	..	..	..	..	..
Whooping-cough	435	189	112	42	10	13	6	183	6	..	..	..	..	..	..	..	..	..	..	1
Fever, typhoid	297	180	2	..	1	3	3	9	11	9	14	22	65	33	8	6	2	1	..	5
Influenza	101	50	1	..	1	..	1	3	..	1	1	2	7	14	9	7	5	1	..	..
Fever, simple and ill-defined	3	2	..	1	..	..	..	1	..	..	..	..	..	..	..	1	..	..	..	..
Fever, cerebro-spinal	178	90	32	9	14	10	3	68	6	5	2	2	4	1	1	..	1	..	..	2
Total miasmatic diseases	3,697	1,846	344	405	320	176	145	1,390	198	27	19	29	84	54	21	14	8	2	..	25
Diarrheal.																				
Cholera morbus	38	15	4	..	..	..	..	4	..	..	..	1	2	..	2	5	1	..	..	..
Cholera infantum	1,076	564	476	79	8	..	..	563	1	..	..	..	..	..	..	..	..	..	..	16
Diarrhea, enterocolitis	1,600	849	612	119	25	6	5	767	1	..	2	6	9	10	8	17	19	8	2	21
Dysentery	160	77	23	9	2	..	3	37	4	2	1	1	6	4	3	2	9	5	3	2
Total diarrheal diseases	2,874	1,505	1,115	207	35	6	8	1,371	6	2	3	8	17	14	13	24	29	13	5	39
Malarial fevers	112	62	7	4	2	2	2	17	1	3	5	2	7	7	8	5	6	..	1	1
Syphilis	137	82	50	3	2	1	..	56	..	..	..	2	9	7	4	4	..	..	..	7
Septic.																				
Erysipelas	122	72	33	1	..	1	..	35	1	1	..	1	7	6	10	8	3	..	..	..
Pyæmia, septicæmia	69	40	13	1	..	..	..	14	2	..	1	1	2	5	8	4	1	1	1	1
Puerperal fever	198	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Total septic diseases	389	112	46	2	..	1	..	49	3	1	1	2	9	11	18	12	4	1	1	1
Other zymotic diseases	3	3	..	..	..	..	..	..	1	..	..	..	..	2	..	..	..	..	..	..
Total zymotic diseases	7,212	3,610	1,562	621	359	186	155	2,883	209	33	28	43	126	95	64	59	47	16	7	73
II.—PARASITIC DISEASES.																				
Aphthæ (thrush)	5	2	2	..	..	..	..	2	..	..	..	..	..	..	..	..	..	..	..	..

Leprosy	2	2	..	..	..	..	..	..	..	..	..	..	..	..	2	..	..	..	..	..
Other parasitic diseases	3	1	..	..	1	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..
Total parasitic diseases	10	5	2	..	1	..	..	3	..	..	..	..	..	..	2	..	..	..	..	..
III.—DIETETIC DISEASES.																				
Starvation, want of breast-milk	3	2	1	..	..	..	..	1	..	..	..	..	..	..	..	..	..	1	..	..
Scurvy	4	4	..	2	..	..	..	2	1	..	..	..	..	..	..	..	1	..	..	..
Intemperance—Alcoholism	360	288	..	..	..	..	..	..	1	..	..	10	86	101	60	23	7	..	..	3
Total dietetic diseases	367	294	1	2	..	..	..	3	2	..	..	10	86	101	60	23	8	1	..	3
IV.—CONSTITUTIONAL DISEASES.																				
Acute rheumatism (rheumatism of the heart)	107	53	..	..	..	..	2	2	9	3	5	3	4	11	8	4	4	..	..	2
Rheumatism	26	13	..	..	..	..	..	..	..	..	..	1	..	2	2	5	1	2	..	1
Gout	1	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..
Rickets	32	17	11	3	1	1	..	16	..	1	..	..	..	..	..	..	..	..	..	..
Cancer	1,141	449	..	1	1	1	1	4	1	..	..	7	24	69	111	127	77	26	3	5
Tabes mesenterica	31	12	9	1	1	..	..	11	..	..	..	..	..	1	..	..	..	..	..	..
Tubercular meningitis	547	305	102	75	38	15	22	252	22	8	3	4	8	3	3	2	..	..	..	4
Phthisis	4,994	2,991	24	26	7	5	1	63	14	10	122	347	932	752	412	224	88	25	2	104
Other forms of tuberculosis, scrofula	303	170	47	17	6	3	6	79	11	7	9	11	21	13	17	2	..	..	..	13
Purpura, hæmophilia	31	13	5	1	..	1	..	7	..	1	2	1	1	..	..	..	1	..	..	2
Anæmia, chlorosis, leucocythæmia	52	23	5	..	1	2	2	10	1	..	..	1	1	4	3	2	1	..	..	1
Diabetes	214	98	..	..	..	..	1	1	1	1	2	2	7	10	14	35	20	3	2	..
Other constitutional diseases	4	1	1	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..
Total constitutional diseases	7,483	4,146	204	124	55	28	35	446	59	31	143	377	998	865	570	401	192	57	7	132
V.—DEVELOPMENTAL DISEASES.																				
Premature birth	873	472	472	..	..	..	..	472	..	..	..	..	..	..	..	..	..	..	..	16
Atelectasis	211	120	120	..	..	..	..	120	..	..	..	..	..	..	..	..	..	..	..	2
Cyanosis	51	35	33	2	..	..	..	35	..	..	..	..	..	..	..	..	..	..	..	..
Umbilical hemorrhage	14	5	5	..	..	..	..	5	..	..	..	..	..	..	..	..	..	..	..	..
Spina bifida	21	13	13	..	..	..	..	13	..	..	..	..	..	..	..	..	..	..	..	..
Imperforate anus	10	8	8	..	..	..	..	8	..	..	..	..	..	..	..	..	..	..	..	..
Cleft palate, harelip	13	4	4	..	..	..	..	4	..	..	..	..	..	..	..	..	..	..	..	..
Other congenital defects	201	116	115	1	..	..	..	116	..	..	..	..	..	..	..	..	..	..	..	4
Old age	602	191	..	..	..	..	..	..	..	..	..	..	..	..	..	21	58	75	37	5
Total developmental diseases	1,996	964	770	3	..	..	..	773	..	..	..	..	..	..	..	21	58	75	37	27
VI.—LOCAL DISEASES. *Diseases of Nervous System.*																				
Meningitis, encephalitis	784	437	168	84	28	16	7	303	29	7	3	8	24	24	22	12	2	3	..	6
Chronic hydrocephalus	33	22	11	5	1	..	1	18	1	..	..	..	1	..	..	2	..	..	..	1
Apoplexy	1,152	600	3	..	..	..	2	5	1	..	2	3	25	48.	110	156	173	68	9	12
Softening of brain	43	20	..	..	..	..	..	..	..	..	..	..	1	..	5	4	10	..	..	..
Hemiplegia, brain paralysis	133	52	..	..	..	..	1	1	1	..	..	..	1	2	11	14	9	11	2	1
Insanity, general paresis	258	177	..	..	..	..	..	..	..	..	2	7	31	61	37	22	12	5	..	6
Epilepsy	82	53	4	3	..	..	1	8	2	5	6	5	12	7	4	1	2	..	1	4

Cause of Death.	Total of Both Sexes.	All Ages	0	1	2	3	4	Total Under 5.	5	10	15	20	25	35	45	55	65	75	85	Colored.
Convulsions	561	328	256	49	12	7	1	325	1	..	..	..	1	1	..	..	..	..	..	16
Congestion of brain	52	28	14	3	3	1	..	21	..	..	1	..	..	3	1	1	1	..	..	1
Laryngismus stridulus	18	11	7	3	1	..	..	11	..	..	..	..	..	..	..	..	..	..	..	..
Idiopathic tetanus, trismus	46	31	29	..	..	..	..	29	..	..	2	..	..	..	..	..	..	..	..	..
Paraplegia, myelitis	90	47	4	1	..	1	..	6	3	1	2	4	7	5	5	5	7	2	..	3
Locomotor ataxy	29	22	..	..	..	..	..	..	..	..	..	1	1	3	10	2	4	1	..	..
Other diseases nervous system	78	42	1	2	..	1	..	4	1	1	2	1	7	10	6	6	3	1	..	1
Total diseases nervous system	3,359	1,870	497	150	45	26	13	731	39	14	20	29	111	164	211	225	223	91	12	51
Diseases Organs of Special Sense.																				
Otitis, oterrhœa, mastoid abscess	70	39	8	3	2	2	..	15	5	3	4	2	3	3	2	1	1	..	..	..
Diseases of Circulatory System.																				
Endocarditis, valvular disease of heart	1,850	931	6	1	4	..	4	15	17	21	34	34	107	150	155	194	134	64	6	45
Pericarditis	66	38	2	..	..	..	..	2	..	1	1	3	9	5	8	2	5	2	..	4
Hypertrophy of heart	34	20	..	..	..	..	..	..	..	1	2	..	1	2	6	7	1	..	..	1
Fatty degeneration of heart	182	77	..	..	..	..	..	..	..	..	..	1	9	9	13	24	14	6	1	..
Heart disease	200	96	2	3	..	..	..	5	..	..	1	4	12	10	18	19	20	7	..	..
Angina pectoris	64	29	1	..	..	..	..	1	..	..	..	..	1	3	5	14	4	1	..	1
Aneurism	56	44	..	..	..	..	..	..	..	..	1	1	6	14	14	7	1	..	..	3
Senile gangrene	25	12	..	..	..	..	..	..	..	..	..	..	..	..	1	4	4	3	..	..
Embolism, thrombosis	75	28	..	..	..	..	..	..	..	..	..	1	5	3	8	4	5	2	..	..
Phlebitis	12	4	..	..	..	..	..	..	..	..	..	..	..	1	..	1	1	1	..	..
Other diseases circulatory system	3	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Total diseases circulatory system	2,567	1,279	11	4	4	..	4	23	17	23	39	44	150	197	228	276	189	86	7	54
Diseases of Respiratory System.																				
Croup	208	120	9	44	24	24	7	108	12	..	..	..	..	..	..	..	..	..	..	..
Laryngitis	17	11	2	1	1	..	2	6	..	..	..	1	1	3	..	..	..	..	..	..
Other diseases larynx and trachea	4	1	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..
Emphysema, asthma	78	39	..	..	1	..	..	1	..	..	..	..	1	4	13	9	8	2	1	1
Bronchitis	1,292	656	398	102	31	19	5	555	10	..	2	3	7	10	17	20	22	8	2	27
Chronic bronchitis	185	91	1	1	..	1	..	3	..	..	1	1	7	4	14	23	27	9	2	..
Pneumonia	5,383	3,046	802	445	156	67	36	1,506	68	14	53	94	294	300	283	225	143	59	7	87
Pleurisy	94	48	2	5	1	..	1	9	1	..	..	2	10	10	5	5	6	..	..	3
Hydrothorax, empyema	107	65	6	10	8	..	1	25	6	..	4	2	12	6	3	7	..	..	..	2
Congestion of lungs	40	23	9	1	..	..	..	10	..	1	..	1	1	3	4	1	2	..	..	1
Hemorrhage of lungs	25	20	2	1	..	..	..	3	..	..	..	4	1	1	5	6	..	..	..	2
Other diseases respiratory system	19	11	..	1	..	..	2	3	..	..	..	..	1	2	4	1	..	..	..	..
Total diseases respiratory system	7,452	4,131	1,231	611	222	111	54	2,229	97	15	60	108	335	344	348	297	208	78	12	123

Diseases of Digestive System.																				
Stomatitis	11	7	2	1	1	1	1	6	1	..	..	..	..	..	..	..	..	..	..	1
Dentition	45	25	15	10	..	..	..	25	..	..	..	..	..	..	..	..	..	..	..	1
Tonsilitis, quinsy	17	9	1	2	..	1	..	4	2	..	..	..	1	1	1	..	..	..	..	..
Gastritis	265	119	44	5	3	..	2	54	1	..	1	3	10	7	12	18	7	6	..	1
Gastro-enteritis	1,135	596	475	65	14	3	3	561	4	1	..	..	3	4	8	5	4	5	1	12
Ulcer of stomach	81	33	..	..	..	..	..	..	1	..	..	1	6	10	9	4	1	1	..	..
Enteritis	196	109	88	9	2	..	..	99	2	..	..	..	1	2	1	1	2	1	..	1
Ulcer of intestine, chronic diarrhea	77	37	2	1	..	..	..	3	..	1	2	2	6	4	4	3	8	3	1	2
Ileus, obstruction of intestine	92	42	9	2	..	2	..	13	..	2	2	1	2	5	6	5	4	2	..	2
Stricture or strangulation of intestine	27	14	6	2	..	..	..	8	2	..	..	..	..	1	..	..	1	2	..	..
Typhlitis, perityphlitis, per. verm. app.	201	129	..	..	..	3	..	3	12	12	15	21	22	21	12	7	4	..	..	2
Hernia	75	34	1	1	..	..	..	2	1	..	1	..	4	4	5	8	5	4	..	..
Peritonitis	142	54	3	2	..	1	..	6	3	3	5	2	8	5	7	10	4	..	1	2
Hepatitis	55	32	..	..	..	1	..	1	3	..	1	1	7	6	3	5	3	1	1	1
Cirrhosis	436	273	..	..	..	..	..	..	..	..	1	2	31	62	85	62	21	9	..	1
Jaundice	60	33	27	..	..	..	..	27	..	..	..	..	..	..	3	2	1	..	..	..
Gall-stones, biliary colic, etc	34	13	..	..	..	..	..	..	..	..	..	..	2	1	4	2	3	1	..	..
Other diseases of liver	38	17	3	..	..	..	..	3	..	..	..	..	3	2	5	..	4	..	..	..
Other diseases of digestive system	53	28	4	..	1	..	..	5	..	..	..	..	3	3	4	9	2	2	..	1
Total diseases of digestive system	3,040	1,604	680	101	21	12	6	820	32	19	28	33	109	138	169	141	74	37	4	27
Diseases of Lymphatic System and Ductless Glands.																				
Lymphadenoma (Hodgkin's disease)	12	8	..	..	..	..	..	..	1	..	1	1	..	3	1	..	1	..	..	..
Exophthalmic goitre (Basedow's disease)	4	1	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..
Addison's disease	4	2	..	..	..	..	..	..	..	..	..	..	..	..	1	1	..	..	..	..
Other diseases lymphatic system	6	1	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	1
Total diseases of lymphatic system	26	12	..	..	..	..	..	..	1	..	1	2	1	3	2	1	1	..	..	1
Diseases of the Urinary System.																				
Acute nephritis	490	244	13	3	9	10	5	40	12	3	5	11	44	40	41	29	15	3	1	13
Bright's disease, albuminuria	2,195	1,173	1	5	2	..	1	9	2	6	13	22	124	184	248	265	207	78	15	31
Uræmia, suppression of urine	79	38	5	..	..	..	..	5	..	..	..	2	7	7	8	3	5	1	..	3
Calculus	14	10	..	..	..	..	..	..	..	..	..	..	1	..	3	2	2	2	..	1
Diseases of bladder and prostate gland	119	111	..	..	..	..	..	..	..	1	..	1	3	9	11	18	37	26	5	3
Other diseases urinary system	6	4	..	..	..	..	..	..	..	..	..	..	..	3	..	..	1	..	..	1
Total diseases of urinary system	2,903	1,580	19	8	11	10	6	54	14	10	18	36	179	243	311	317	267	110	21	52
Diseases of Organs of Generation.																				
Ovarian diseases	15	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Diseases of uterus and vagina	46	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Pelvic abscess	8	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Perineal abscess	3	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Diseases of penis, testes, scrotum, etc.	9	9	1	..	..	..	..	1	..	1	..	..	..	2	3	..	2	..	..	1
Total diseases of organs of generation	81	9	1	..	..	..	..	1	..	1	..	..	..	2	3	..	2	..	..	1

CAUSE OF DEATH.	Total of Both Sexes.	All ages.	0	1	2	3	4	Total Under 5.	5	10	15	20	25	35	45	55	65	75	85	Colored.
Diseases of Parturition.																				
Abortion, miscarriage	47	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Puerperal convulsions	70	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Puerperal mania	9	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Placenta prævia, flooding	17	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Post-partum, hemorrhage	17	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Other diseases of parturition	58	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Total diseases of parturition	218	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Diseases of Organs of Locomotion.																				
Caries, necrosis	9	2	..	..	..	..	..	..	..	1	..	..	1	..	..	..	..	..	..	..
Arthritis, osteitis, periostitis	10	8	1	..	..	..	..	1	..	1	2	1	2	..	1	..	..	..	..	..
Spinal disease	30	17	..	1	..	2	3	6	5	..	2	2	2	..	..	..	..	..	..	1
Hip disease	21	11	..	1	..	1	1	3	3	2	1	..	1	1	..	..	..	..	..	1
Other diseases locomotor system	6	3	..	..	..	..	..	..	..	..	..	1	1	..	1	..	..	..	..	..
Total diseases of organs of locomotion	76	41	1	2	..	3	4	10	8	4	5	4	7	1	2	..	..	..	..	2
Diseases of the Integumentary System.																				
Carbuncle	8	2	..	..	..	..	..	..	..	..	..	..	..	..	..	2	..	..	..	..
Phlegmon, cellulitis	19	9	3	..	..	..	..	3	..	..	..	..	..	3	2	1	..	..	..	..
Ulcer, bedsore	3	2	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	1	..	..
Eczema	9	6	3	..	1	..	1	5	..	..	..	..	..	..	..	..	..	1	..	..
Pemphigus	6	2	2	..	..	..	..	2	..	..	..	..	..	..	..	..	..	..	..	..
Other diseases of integumentary system	46	27	17	1	1	1	..	20	..	..	..	..	..	2	3	2	..	..	..	..
Total diseases of integumentary system	91	48	25	1	2	1	1	30	..	..	..	..	..	5	5	5	2	1	..	..
Total local diseases	19,883	10,613	2,473	880	307	165	88	3,913	213	89	175	258	895	1,100	1,281	1,263	966	404	56	311
VII.—VIOLENCE.																				
Accident and Negligence.																				
Criminal abortion	5	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Fractures, contusions	756	622	6	5	12	9	9	41	53	28	23	44	137	128	74	49	36	8	1	9
Wounds	27	22	..	..	2	..	..	2	1	..	7	1	4	5	6	1	..	..	..	1
Cut, stab	1	1	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..
Burn, scald	175	68	4	17	8	6	5	40	4	..	3	3	6	5	4	2	..	..	1	3
Poison	94	61	2	1	3	..	..	6	..	..	1	6	20	12	7	7	2	..	..	..
Drowning	213	199	3	..	1	..	..	4	11	10	7	10	38	62	37	16	3	1	..	2
Suffocation	55	28	16	..	1	..	..	17	..	..	..	1	2	2	2	2	2	..	..	1
Sunstroke	765	549	17	4	1	..	..	22	2	2	1	19	143	158	124	50	20	8	..	2
Surgical operations	530	180	23	8	3	2	1	37	6	9	9	14	18	18	28	20	16	5	..	3

Electric current	4	4	..	..	..	..	..	..	..	..	..	..	3	1	..	..	..	..	..	..
Neglect, exposure	7	4	2	..	..	..	..	2	..	..	..	1	..	..	..	..	1	..	..	..
Other forms	9	7	..	..	..	..	..	..	1	..	..	..	1	2	1	2	..	..	..	..
Total accident and negligence	2,641	1,745	73	35	31	17	15	171	78	49	46	99	372	394	283	149	80	22	2	21
Homicide.																				
Blows	18	11	..	..	..	..	..	..	..	..	1	3	4	2	..	1	..	..	..	..
Cut, stab	17	12	..	..	..	..	..	..	1	..	2	2	3	2	1	..	1	..	..	1
Gunshot	30	22	..	..	1	..	..	1	..	..	2	2	9	5	2	1	..	..	..	2
Other methods	6	3	2	..	..	..	..	2	..	..	..	..	..	1	..	..	..	..	..	..
Total homicides	71	48	2	..	1	..	..	3	1	..	5	7	16	10	3	2	1	..	..	3
Suicide.																				
Illuminating gas	35	25	..	..	..	..	..	..	..	..	..	3	4	7	6	4	1	..	..	..
Cut, stab	16	15	..	..	..	..	..	..	..	..	..	1	6	1	3	2	1	..	1	..
Drowning	12	7	..	..	..	..	..	..	..	..	..	..	1	3	2	..	1	..	..	..
Gunshot	121	114	..	..	..	..	..	..	..	1	..	9	29	29	21	21	3	1	..	..
Hanging	54	50	..	..	..	..	..	..	..	1	2	5	9	9	8	9	7	..	..	..
Leaps	19	13	..	..	..	..	..	..	..	..	1	1	5	1	2	1	2	..	..	..
Poison	123	69	..	..	..	..	..	..	..	..	1	8	12	19	18	7	3	1	..	..
Other methods	4	2	..	..	..	..	..	..	..	..	..	..	..	1	1	..	..	..	..	..
Total suicides	384	295	..	..	..	..	..	..	..	2	4	27	66	70	61	44	18	2	1	..
Total violence	3,096	2,088	75	35	32	17	15	174	79	51	55	133	454	474	347	195	99	24	3	24
VIII.—ILL-DEFINED OR NOT SPECIFIED CAUSES.																				
Marasmus, inanition	1,389	762	729	29	2	2	..	762	..	..	..	..	..	..	..	..	..	..	..	23
Injury at birth	186	110	110	..	..	..	..	110	..	..	..	..	..	..	..	..	..	..	..	1
Total ill-defined causes	1,575	872	839	29	2	2	..	872	..	..	..	..	..	..	..	..	..	..	..	24
I.—Specific febrile diseases	7,212	3,610	1,562	621	359	186	155	2,883	209	33	28	43	126	95	64	59	47	16	7	73
II.—Parasitic diseases	10	5	2	1	..	..	..	3	..	..	..	..	..	..	2	..	..	..	..	..
III.—Dietetic diseases	367	294	1	2	..	..	..	3	2	..	..	10	86	101	60	23	8	1	..	3
IV.—Constitutional diseases	7,483	4,146	204	124	55	28	35	446	59	31	143	377	998	865	570	401	192	57	7	132
V.—Developmental diseases	1,996	964	770	3	..	..	..	773	..	..	..	..	..	..	..	21	58	75	37	27
VI.—Local diseases	19,883	10,613	2,473	880	307	165	88	3,913	213	89	175	258	895	1,100	1,281	1,263	966	404	56	311
VII.—Violence	3,096	2,088	75	35	32	17	15	174	79	51	55	133	454	474	347	195	99	24	3	24
VIII.—Ill-defined causes	1,575	872	839	29	2	2	..	872	..	..	..	..	..	..	..	..	..	..	..	24
Total all causes	41,622	22,592	5,926	1,695	755	398	293	9,067	562	204	401	821	2,559	2,635	2,324	1,962	1,370	577	110	594

Deaths of Females by Age and Cause of Death, Year ending December 31, 1896.

Cause of Death.	All Ages.	0	1	2	3	4	Total Under 5.	5	10	15	20	25	35	45	55	65	75	85	Colored.
I.—Specific Febrile (Zymotic) Diseases.																			
Miasmatic.																			
Chicken-pox	1	..	..	..	1	..	1	..	..	..	..	..	..	..	..	..	..	..	..
Measles	359	88	133	77	31	8	337	15	1	1	2	2	..	1	..	..	..	..	4
Scarlet fever	199	12	25	43	49	13	142	46	6	1	..	3	1	..	..	..	..	..	..
Diphtheria	787	60	169	167	128	92	616	139	16	3	5	6	1	1	..	..	..	..	7
Mumps	2	..	..	..	..	..	..	..	..	..	..	1	..	..	1	..	..	..	..
Whooping-cough	246	113	66	34	18	5	236	10	..	..	..	..	..	..	..	..	..	..	12
Fever, typhoid	117	2	..	2	..	1	5	13	9	13	18	22	20	11	5	1	..	..	2
Influenza	51	2	3	..	1	..	6	1	1	1	1	6	3	4	7	15	4	2	1
Fever, simple and ill-defined	1	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..
Fever, cerebro-spinal	88	23	21	10	3	8	65	8	5	3	1	3	..	1	..	1	1	..	2
Total miasmatic diseases	1,851	300	417	333	231	127	1,408	232	38	22	27	43	26	18	13	17	5	2	28
Diarrheal.																			
Cholera morbus	23	1	..	..	..	..	1	..	..	..	3	3	1	5	4	1	2	3	1
Cholera infantum	512	421	78	10	3	..	512	..	..	..	..	..	..	..	..	..	..	..	11
Diarrhea, enterocolitis	751	503	95	24	10	7	639	11	2	1	2	9	12	13	24	25	9	4	18
Dysentery	83	8	6	6	..	1	21	3	2	6	5	7	6	7	7	8	9	2	1
Total diarrheal diseases	1,369	933	179	40	13	8	1,173	14	4	7	10	19	19	25	35	34	20	9	31
Malarial fevers	50	10	3	3	3	..	19	3	1	2	1	4	5	3	7	3	1	1	4
Syphilis	55	42	1	1	..	..	44	2	..	..	..	2	4	2	..	1	..	..	5
Septic.																			
Erysipelas	50	24	2	..	..	..	26	..	2	1	3	2	2	5	3	6	..	..	..
Pyæmia, septicæmia	29	7	1	2	2	..	12	..	..	1	4	6	3	..	3	..	..	..	..
Puerperal fever	198	..	..	..	..	..	..	..	..	10	44	101	43	..	..	..	..	..	1
Total septic diseases	277	31	3	2	2	..	38	..	2	12	51	109	48	5	6	6	..	..	1
Total zymotic diseases	3,602	1,316	603	379	249	135	2,682	251	45	43	89	177	102	53	61	61	26	12	69
II.—Parasitic Diseases.																			
Aphthæ (thrush)	3	3	..	..	..	..	3	..	..	..	..	..	..	..	..	..	..	..	..
Other parasitic diseases	2	..	..	..	1	..	1	..	..	1	..	..	..	..	..	..	..	..	..
Total parasitic diseases	5	3	..	..	1	..	4	..	..	1	..	..	..	..	..	..	..	..	..

III.—Dietetic Diseases.																			
Starvation, want of breast milk	1	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..
Intemperance—Alcoholism	72	..	..	..	..	..	..	..	..	1	5	28	18	9	9	2	..	..	..
Total dietetic diseases	73	..	..	..	..	..	..	..	..	1	5	28	18	9	10	2	..	..	..
IV.—Constitutional Diseases.																			
Acute rheumatism (rheumatism of the heart)	54	3	..	4	..	3	10	4	5	2	3	4	8	5	6	3	4	..	..
Rheumatism	13	..	..	..	..	..	..	..	..	..	..	..	1	2	5	5	..	..	2
Rickets	15	9	4	..	1	..	14	..	1	..	..	..	..	..	..	..	..	..	1
Cancer	692	3	1	1	1	..	6	2	..	2	7	47	121	189	161	118	30	9	10
Tabes mesenterica	19	11	4	2	..	..	17	1	..	..	..	..	..	..	..	1	..	..	1
Tubercular meningitis	242	85	59	25	18	15	202	23	4	5	2	4	1	..	1	..	..	..	6
Phthisis	2,003	21	15	13	5	3	57	18	38	154	342	625	389	181	110	69	18	2	79
Other forms of tuberculosis, scrofula	133	26	14	6	7	4	57	11	11	16	8	15	4	4	3	2	2	..	10
Purpura, hæmophilia	18	6	..	1	1	1	9	..	..	..	2	2	1	3	1	..	..	..	..
Anæmia, chlorosis, leucocythæmia	29	2	1	1	..	1	5	1	1	4	1	4	..	4	7	..	2	..	..
Diabetes	116	..	..	..	..	..	..	..	..	1	1	3	4	32	40	26	9	..	..
Other constitutional diseases	3	..	..	..	..	..	..	..	..	..	..	1	1	1	..	..	..	..	..
Total constitutional diseases	3.337	166	98	53	33	27	377	60	60	184	366	705	530	421	334	224	65	11	109
V.—Developmental Diseases.																			
Premature birth	401	401	..	..	..	..	401	..	..	..	..	..	..	..	..	..	..	..	17
Atelectasis	91	91	..	..	..	..	91	..	..	..	..	..	..	..	..	..	..	..	2
Cyanosis	16	15	..	..	..	1	16	..	..	..	..	..	..	..	..	..	..	..	..
Umbilical hemorrhage	9	9	..	..	..	..	9	..	..	..	..	..	..	..	..	..	..	..	1
Spina bifida	8	8	..	..	..	..	8	..	..	..	..	..	..	..	..	..	..	..	..
Imperforate anus	2	2	..	..	..	..	2	..	..	..	..	..	..	..	..	..	..	..	..
Cleft palate, harelip	9	9	..	..	..	..	9	..	..	..	..	..	..	..	..	..	..	..	..
Other congenital defects	85	83	1	..	..	..	84	..	..	..	..	..	1	..	..	..	..	..	1
Old age	411	..	..	..	..	..	..	..	..	..	..	..	..	..	29	119	177	86	15
Total developmental diseases	1,032	618	1	..	..	1	620	..	..	..	..	..	1	..	29	119	177	86	36
VI.—Local Diseases.																			
Diseases of Nervous System.																			
Meningitis, encephalitis	347	135	71	32	17	13	268	22	7	6	3	13	6	8	9	5	..	..	8
Chronic hydrocephalus	11	5	4	1	..	..	10	..	1	..	..	..	..	..	..	..	..	..	..
Apoplexy	552	4	1	1	1	..	7	..	2	1	5	16	41	96	139	149	71	25	16
Softening of brain	23	..	..	..	..	..	..	..	..	..	1	2	3	..	5	7	3	2	..
Hemiplegia, brain paralysis	81	..	..	..	..	..	..	..	..	..	..	..	5	13	24	26	8	5	1
Insanity, general paresis	81	..	..	..	..	..	..	..	..	1	2	19	17	13	13	9	7	..	1
Epilepsy	29	1	..	1	..	..	2	2	2	3	6	2	6	1	3	2	..	..	..
Convulsions	233	176	35	14	5	3	233	..	..	..	..	..	..	..	..	..	..	..	10
Congestion of brain	24	8	4	2	2	1	17	1	..	1	..	..	..	3	..	2	..	..	..
Laryngismus stridulus	7	6	..	..	..	..	6	1	..	..	..	..	..	..	..	..	..	..	..
Idiopathic tetanus, trismus	15	15	..	..	..	..	15	..	..	..	..	..	..	..	..	..	..	..	..
Paraplegia, myelitis	43	3	..	4	..	..	7	2	..	1	4	6	6	3	6	5	2	1	2

CAUSE OF DEATH.	All Ages.	0	1	2	3	4	Total Under 5.	5	10	15	20	25	35	45	55	65	75	85	Colored.
Locomotor ataxy	7	..	..	..	..	..	..	..	..	..	..	..	2	4	1	..	..	..	1
Other diseases nervous system	36	..	..	..	..	..	..	1	1	..	4	10	6	7	4	2	1	..	..
Total diseases nervous system	1,489	353	115	55	25	17	565	29	13	13	25	68	92	148	204	207	92	33	39
Diseases Organs of Special Sense.																			
Otitis, otorrhœa, mastoid abscess	31	8	3	1	2	..	14	2	3	2	4	..	2	1	1	2	..	..	2
Diseases of Circulatory System.																			
Endocarditis, valvular disease of heart	919	3	2	3	2	3	13	29	38	38	55	92	113	144	185	133	64	15	37
Pericarditis	28	..	1	..	..	..	1	3	3	..	..	6	6	3	2	4	..	..	2
Hypertrophy of heart	14	..	..	..	..	..	..	1	..	..	..	1	1	3	2	2	4	..	..
Fatty degeneration of heart	105	..	..	..	..	..	..	..	1	..	..	7	15	23	24	25	8	2	6
Heart disease	104	1	..	..	..	..	1	..	2	2	3	10	17	16	24	16	11	2	8
Angina pectoris	35	..	..	..	..	..	..	..	..	1	4	2	6	6	4	9	2	1	1
Aneurism	12	..	..	..	..	..	..	..	..	..	..	2	4	2	3	1	..	..	3
Senile gangrene	13	..	..	..	..	..	..	..	..	..	..	..	..	2	4	2	5	..	1
Embolism, thrombosis	47	..	..	..	..	..	..	..	..	1	4	8	6	8	9	4	6	1	1
Phlebitis	8	1	..	..	..	..	1	..	..	..	..	1	3	1	1	..	..	1	..
Other diseases circulatory system	3	..	..	..	..	..	..	..	..	..	..	1	1	..	1	..	..	..	..
Total diseases circulatory system	1,288	5	3	3	2	3	16	33	44	42	66	130	172	208	259	196	100	22	59
Diseases of Respiratory System.																			
Croup	88	5	28	21	13	9	76	12	..	..	..	..	..	..	..	..	..	..	1
Laryngitis	6	1	1	1	1	..	4	..	..	..	1	..	..	..	1	..	..	..	..
Other Diseases Larnyx and Trachea	3	1	..	1	1	..	3	..	..	..	..	..	..	..	..	..	..	..	..
Emphysema, asthma	39	..	..	..	..	..	..	..	..	..	..	2	4	7	10	12	3	1	1
Bronchitis	636	323	117	31	19	7	497	8	1	1	3	5	9	14	35	33	23	7	17
Chronic bronchitis	94	1	1	1	..	..	3	1	..	..	4	4	4	7	20	34	13	4	..
Pneumonia	2,337	620	370	142	67	37	1,236	58	21	34	57	155	146	175	193	164	81	17	83
Pleurisy	46	2	..	1	..	..	3	1	1	2	5	7	10	7	5	3	2	..	..
Hydrothorax, empyema	42	6	8	8	2	..	24	2	..	3	..	4	5	1	1	2	..	..	2
Congestion of lungs	17	3	..	1	..	1	5	3	1	..	1	..	1	..	2	3	1	..	1
Hemorrhage of lungs	5	1	..	..	..	..	1	..	..	1	..	1	..	1	1	..	..	..	1
Other diseases respiratory system	8	1	..	..	..	1	2	..	..	..	1	1	..	3	..	..	1	..	..
Total diseases respiratory system	3,321	964	525	207	103	55	1,854	85	24	41	72	179	179	215	268	251	124	29	106
Diseases of Digestive System.																			
Stomatitis	4	..	..	2	1	..	3	..	..	..	..	..	..	1	..	..	..	..	..
Dentition	20	11	9	..	..	..	20	..	..	..	..	..	..	..	..	..	..	..	1
Tonsilitis, quinsy	8	1	..	..	1	..	2	1	2	..	..	..	..	2	..	1	..	..	..
Gastritis	146	25	7	3	1	4	40	5	..	3	3	17	14	16	16	17	12	3	1

Gastro-enteritis	539	401	77	8	9	3	498	5	..	..	2	6	2	9	5	7	3	2	6
Ulcer of stomach	48	1	..	..	..	..	1	1	..	4	5	10	6	8	8	4	1	..	2
Enteritis	87	57	6	3	2	..	68	1	1	1	..	3	3	2	2	4	1	1	2
Ulcer of intestine, chronic diarrhea	40	1	2	..	..	..	3	..	..	..	..	4	5	7	8	8	3	2	1
Ileus, obstruction of intestine	50	7	1	..	..	..	8	2	2	..	1	7	6	9	7	6	2	..	2
Stricture or strangulation of intestine	13	4	..	..	..	..	4	..	..	..	..	2	2	1	2	2	..	..	1
Typhlitis, perityphlitis, perforation of vermiform appendix	72	..	..	1	..	..	1	11	7	7	9	15	8	5	5	3	1	..	1
Hernia	41	2	..	..	..	..	2	..	..	..	..	..	7	8	12	10	1	1	..
Peritonitis	88	6	2	..	1	1	10	4	..	4	9	22	12	12	13	1	1	..	4
Hepatitis	23	1	..	..	..	..	1	..	..	1	..	2	6	7	3	3	..	..	2
Cirrhosis	163	..	..	..	..	..	..	1	..	..	3	25	41	40	27	16	10	..	3
Jaundice	27	17	1	..	..	..	18	..	..	..	..	2	..	2	2	2	1	..	..
Gall-stones, biliary colic, etc	21	..	..	..	1	..	1	..	..	..	..	3	1	8	2	2	4	..	..
Other diseases of liver	21	1	..	..	..	..	1	..	..	..	1	2	6	5	3	3	..	..	..
Other diseases of digestive system	25	10	..	..	..	..	10	..	..	..	1	2	..	5	5	1	1	..	1
Total diseases of digestive system	1,436	545	105	17	16	8	691	31	12	20	34	122	119	147	120	90	41	9	27
Diseases of Lymphatic System and Ductless Glands.																			
Lymphadenoma (Hodgkin's disease)	4	..	..	..	..	..	..	..	..	..	..	1	..	2	1	..	..	..	..
Exophthalmic goitre (Basedow's disease)	3	..	..	..	..	..	..	..	..	..	2	..	..	1	..	..	..	..	..
Addison's Disease	2	..	..	..	..	..	..	..	..	..	..	1	1	..	..	..	..	..	..
Other diseases lymphatic system	5	..	..	..	..	..	..	..	..	..	..	..	1	1	3	..	..	..	..
Total diseases of lymphatic system	14	..	..	..	..	..	..	..	..	..	2	2	2	4	4	..	..	..	..
Diseases of the Urinary System.																			
Acute nephritis	246	12	10	4	5	4	35	12	4	6	14	45	32	34	33	20	10	1	7
Bright's disease, albuminuria	1,022	3	3	1	1	1	9	6	6	13	26	104	166	192	214	176	95	15	30
Uræmia, suppression of urine	41	4	..	..	..	..	4	..	1	2	2	6	5	8	6	6	1	..	..
Calculus	4	..	..	..	..	..	..	..	..	..	..	..	2	..	1	1	..	..	..
Diseases of bladder and prostate gland	8	..	..	..	..	..	..	..	..	1	..	1	..	..	..	5	1	..	..
Other diseases urinary system	2	..	..	..	..	..	..	..	..	..	..	..	2	..	..	..	..	..	..
Total diseases of urinary system	1,323	19	13	5	6	5	48	18	11	22	42	156	207	234	254	208	107	16	37
Diseases of Organs of Generation.																			
Ovarian diseases	15	..	..	..	..	..	..	..	..	..	1	3	3	3	4	1	..	..	1
Diseases of uterus and vagina	46	..	..	..	..	..	..	..	..	2	6	18	12	7	1	..	..	..	2
Pelvic abscess	8	..	..	..	..	..	..	..	..	..	..	4	3	1	..	..	..	..	2
Perineal Abcess	3	..	..	..	..	..	..	..	..	..	1	1	1	..	..	..	..	..	..
Total diseases of organs of generation	72	..	..	..	..	..	..	..	..	2	8	26	19	11	5	1	..	..	5
Diseases of Parturition.																			
Abortion, miscarriage	47	..	..	..	..	..	..	..	..	1	13	26	7	..	..	..	..	..	2
Puerperal convulsions	70	..	..	..	..	..	..	..	..	3	20	27	18	2	..	..	..	..	2
Puerperal mania	9	..	..	..	..	..	..	..	..	..	1	5	3	..	..	..	..	..	..
Placenta prævia, flooding	17	..	..	..	..	..	..	..	..	..	2	8	7	..	..	..	..	..	..

CAUSE OF DEATH.	All Ages.	0	1	2	3	4	Total Under 5.	5	10	15	20	25	35	45	55	65	75	85	Colored.
Post-partum, hemorrhage	17	..	..	..	..	..	..	..	..	1	3	9	4	..	..	..	..	..	..
Other diseases of parturition	58	..	..	..	..	..	..	..	..	2	6	33	17	..	..	..	..	..	2
Total diseases of parturition	218	..	..	..	..	..	..	..	..	7	45	108	56	2	..	..	..	..	6
Diseases of Organs of Locomotion.																			
Caries, necrosis	7	..	..	..	..	1	1	1	..	..	1	1	..	1	1	..	1	..	..
Arthritis, ostitis, periostitis	2	1	..	..	..	..	1	..	..	..	..	..	1	..	..	..	..	..	..
Spinal disease	13	2	..	1	..	1	4	3	1	1	1	1	1	1	..	..	..	..	1
Hip disease	10	..	..	..	..	..	..	3	1	1	..	3	1	1	..	..	..	..	..
Other diseases locomotor system	3	..	..	..	..	..	..	..	..	..	..	1	1	..	1	..	..	..	..
Total diseases of organs of locomotion	35	3	..	1	..	2	6	7	2	2	2	6	4	3	2	..	1	..	1
Diseases of the Integumentary System.																			
Carbuncle	6	..	..	..	..	..	..	..	..	..	..	..	1	3	1	1	..	..	..
Phlegmon, cellulitis	10	3	..	..	..	..	3	..	..	..	1	2	1	1	..	2	..	..	1
Ulcer, bedsore	1	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..
Eczema	3	3	..	..	..	..	3	..	..	..	..	..	..	..	..	..	..	..	1
Pemphigus	4	4	..	..	..	..	4	..	..	..	..	..	..	..	..	..	..	..	..
Other diseases of integumentary system	19	8	3	1	3	..	15	1	..	..	..	..	..	1	1	..	..	1	..
Total diseases of integumentary system.	43	18	3	1	3	..	25	1	..	..	1	2	2	6	2	3	..	1	2
Total local diseases	9,270	1,915	767	290	157	90	3,219	205	109	151	301	799	854	979	1,119	958	465	110	284
VII.—VIOLENCE. *Accident and Negligence.*																			
Criminal abortion	5	..	..	..	..	..	..	..	..	..	2	3	..	..	..	..	..	..	..
Fractures, contusions	134	1	5	8	7	7	28	9	4	2	7	12	13	15	13	15	11	5	1
Wounds	5	..	..	..	..	1	1	..	1	..	..	..	1	1	1	..	..	..	..
Burn, scald	107	1	17	3	8	10	39	11	4	5	11	13	5	6	6	5	2	..	7
Poison	33	2	..	..	..	..	2	..	..	3	5	14	3	..	3	1	2	..	1
Drowning	14	1	1	1	..	..	3	1	..	2	1	1	2	3	1	..	..	..	..
Suffocation	27	23	..	..	1	..	24	1	1	..	..	..	1	..	..	..	..	..	2
Sunstroke	216	13	4	1	..	..	18	..	..	2	7	37	21	40	47	29	12	3	1
Surgical operations	350	12	1	..	1	1	15	9	4	5	32	99	102	54	23	7	..	..	18
Neglect, exposure	3	2	..	..	..	..	2	1	..	..	..	..	..	..	..	..	..	..	..
Other forms	2	..	..	..	..	..	..	..	..	..	..	1	..	..	1	..	..	..	..
Total accidents and negligence	896	55	28	13	17	19	131	32	14	19	65	180	148	119	95	57	27	8	30
Homicide.																			
Blows	7	..	..	..	..	..	..	..	1	..	1	2	1	2	..	..	..	..	..
Cut, stab	5	2	..	..	..	..	2	..	..	..	2	..	1	..	..	..	..	..	..

Gunshot	8	..	..	..	..	1	1	..	..	..	2	4	..	1	..	..	..	..	2
Other methods	3	1	..	..	..	..	1	..	1	..	1	..	..	..	..	..	..	..	..
Total homicides	23	3	..	..	..	1	4	..	2	..	6	6	2	3	..	..	..	..	2
Suicide.																			
Illuminating gas	10	..	..	..	..	..	..	..	..	..	2	5	..	1	2	..	..	..	..
Cut, stab	1	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..
Drowning	5	..	..	..	..	..	..	..	..	..	..	2	1	1	..	1	..	..	..
Gunshot	7	..	..	..	..	..	..	..	..	..	..	3	2	2	..	..	..	..	..
Hanging	4	..	..	..	..	..	..	..	..	..	..	..	2	..	1	..	..	1	..
Leaps	6	..	..	..	..	..	..	..	..	..	..	1	3	..	1	..	1	..	..
Poison	54	..	..	..	..	..	..	..	..	11	7	11	15	6	2	1	1	..	2
Other methods	2	..	..	..	..	..	..	..	..	..	..	1	..	..	1	..	..	..	..
Total suicides	89	..	..	..	..	..	..	..	..	11	9	23	24	10	7	2	2	1	2
Total violence	1,008	58	28	13	17	20	136	32	16	30	80	209	174	132	102	59	29	9	34
VIII.—ILL-DEFINED OR NOT SPECIFIED CAUSES.																			
Marasmus, inanition	627	599	19	7	..	1	626	1	..	..	..	..	..	..	..	..	..	..	16
Injury at birth	76	76	..	..	..	..	76	..	..	..	..	..	..	..	..	..	..	..	1
Total ill-defined causes	703	675	19	7	..	1	702	1	..	..	..	..	..	..	..	..	..	..	17
I.—Specific febrile diseases	3,602	1,316	603	379	249	135	2,682	251	45	43	89	177	102	53	61	61	26	12	69
II.—Parasitic diseases	5	3	..	..	1	..	4	..	..	1	..	..	..	..	..	..	..	..	..
III.—Dietetic diseases	73	..	..	..	..	..	..	..	..	1	5	28	18	9	11	1	..	..	..
IV.—Constitutional diseases	3,337	166	98	53	33	27	377	60	60	184	366	705	530	421	334	224	65	11	109
V.—Developmental diseases	1,032	618	1	..	..	1	620	..	..	..	..	..	1	..	29	119	177	86	30
VI.—Local diseases	9,270	1,915	767	290	157	90	3,219	206	109	151	301	799	854	979	1,119	958	465	110	284
VII.—Violence	1,008	58	28	13	17	20	136	32	16	30	80	209	174	132	102	59	29	9	34
VIII.—Ill-defined causes	703	675	19	7	..	1	702	1	..	..	..	..	..	..	..	..	..	..	17
Total all causes	19,030	4,751	1,516	742	457	274	7,740	550	230	410	841	1,918	1,679	1,594	1,656	1,422	762	228	549
Total males	22,592	5,926	1,695	755	398	293	9,067	562	204	401	821	2,559	2,635	2,324	1,962	1,370	577	110	594
Total females	19,030	4,751	1,516	742	457	274	7,740	550	230	410	841	1,918	1,679	1,594	1,656	1,422	762	228	549
Total both sexes	41,622	10,677	3,211	1,497	855	567	16,807	1,112	434	811	1,662	4,477	4,314	3,918	3,618	2,792	1,339	338	1143

Actual Mortality from the Principal Causes, by Months, with Ages of Decedents and Meteorology, for the Year 1896.

Estimated population, July 1, 1896, 1,934,077. Death-rate per 1,000 inhabitants, 21.52.

METEOROLOGY.	Mean barometer	30.078	29.787	29.871	30.044	29.962	29.879	29.916	29.930	29.919	29.900	30.057	30.023	29.947
	Mean humidity	80	81	76	63	61	69	72	69	74	69	68	59	70
	Maximum humidity	100	100	100	100	85	94	90	90	100	100	94	100	100
	Minimum humidity	50	31	25	29	27	33	42	45	44	40	42	24	36
	Inches of rain	0.96	6.33	5.28	1.27	2.51	5.72	7.41	1.53	4.74	1.74	2.84	1.13	41.96
	Mean temperature (Fahr.)	29.8°	31.9°	32.6°	52.3°	67.0°	69.8°	76.8°	76.1°	67.2°	53.8°	49.9°	34.2°	53.4°
	Maximum temperature (Fahr.)	49°	57°	60°	90°	92°	92°	91°	93°	89°	72°	72°	57°	98°
	Minimum temperature (Fahr)	—2°	—5°	14°	24°	45°	52°	60°	57°	46°	36°	29°	9°	—5°
CAUSE OF DEATH.		JAN.	FEB.	MAR.	APR.	MAY.	JUNE.	JULY.	AUG.	SEPT.	OCT.	NOV.	DEC.	YEAR.
Total all causes		3,657	3,379	3,913	3,912	3,454	3,281	4,214	4,497	3,059	2,863	2,574	2,819	41,622
Influenza		16	18	17	26	5	..	1	1	..	2	4	11	101
Cerebro-spinal meningitis		16	12	25	18	20	17	22	11	11	7	9	10	178
Diphtheria		179	163	127	129	167	150	119	98	96	75	110	142	1,555
Erysipelas		11	17	13	22	11	13	5	5	5	3	9	8	122
Malarial fevers		7	5	8	9	10	11	9	9	12	22	6	4	112
Measles		93	95	118	126	79	69	44	29	12	14	12	23	714
Scarlet fever		74	53	37	41	46	26	25	9	12	20	28	31	402
Small-pox		..	..	..	..	1	..	..	..	..	..	..	..	1
Typhoid fever		20	17	11	12	10	13	25	42	38	39	34	36	297
Whooping-cough		33	16	44	50	51	33	51	50	49	26	14	18	435
Cholera morbus		..	..	..	..	1	7	17	10	2	1	..	..	38
Other diarrheal diseases		60	35	61	104	114	382	956	633	275	120	52	44	2,836
Diarrheal diseases under 5 years		49	29	54	86	92	363	880	564	245	105	41	36	2,544
Other zymotic diseases		16	15	16	19	29	29	20	23	9	19	12	15	222
Cancer		97	96	91	103	93	94	93	101	79	93	105	96	1,141
Rheumatism		12	17	14	10	10	9	6	5	5	6	4	9	107
Phthisis		460	415	466	468	495	409	364	404	408	383	326	396	4,994
Other constitutional diseases		86	94	145	147	111	114	121	106	90	82	57	87	1,240
Apoplexy		105	109	116	90	111	83	91	117	89	80	69	92	1,152
Convulsions		39	33	50	60	54	57	58	47	45	43	46	29	561
Meningitis and encephalitis		54	50	81	86	76	62	85	99	58	50	32	51	784
Other diseases of nervous system		70	80	77	65	56	75	82	92	46	76	71	71	861
Aneurism		5	2	6	2	7	3	4	4	9	9	3	2	56
Heart diseases		217	191	242	215	214	165	170	165	185	240	197	189	2,396
Other diseases of circulatory system		13	10	13	14	11	9	4	10	8	5	12	6	115

Bronchitis	142	131	179	177	125	67	58	80	72	88	76	97	1,292
Croup	29	24	31	17	25	15	7	6	9	12	17	16	208
Pneumonia	633	619	739	803	522	284	257	218	298	340	324	346	5,383
Other diseases of respiratory system	61	58	58	71	46	33	35	37	33	43	33	41	569
Gastritis, gastro-enteritis, enteritis and peritonitis	86	74	95	97	78	179	357	315	207	119	62	69	1,738
Cirrhosis of liver and hepatitis	46	41	52	32	45	33	45	41	47	33	34	42	491
Other diseases of digestive system	66	78	77	64	51	65	96	67	56	63	56	72	811
Bright's disease and nephritis	269	260	265	231	223	204	225	238	169	189	200	212	2,685
Other urinary diseases	22	23	14	17	11	15	16	21	18	26	16	19	218
Premature and preternatural births, cyanosis and atelectasis	116	104	139	122	102	88	102	101	110	109	125	103	1,321
Puerperal diseases	38	44	47	44	37	31	30	30	21	28	33	33	416
Old age	51	65	51	50	46	32	44	77	49	42	43	52	602
Alcoholism	40	38	47	24	21	25	29	31	28	20	27	30	360
Sunstroke	....	....	....	1	4	5	30	725	....	....	....	....	765
Accident	130	141	154	167	181	171	209	916	164	142	119	147	2,641
Homicide	3	7	6	2	4	3	8	7	9	6	6	10	71
Suicide	42	32	22	26	28	29	41	34	33	25	38	34	384
Under one month	271	198	249	231	198	214	287	265	232	223	225	209	2,802
One month and under one year	489	447	619	687	527	823	1,421	1,015	601	487	333	366	7,875
Total under five years	1,406	1,218	1,517	1,578	1,334	1,545	2,294	1,832	1,311	1,026	846	900	16,807
Sixty-five years and over	396	415	441	406	367	306	328	496	294	366	319	335	4,469
Males	1,968	1,897	2,145	2,087	1,796	1,759	2,282	2,515	1,657	1,541	1.420	1,525	22,592
Females	1,689	1,482	1,768	1,825	1,658	1,522	1,932	1,982	1,402	1,322	1,154	1,294	19,030
Colored	92	80	97	118	110	104	106	94	90	86	83	83	1,143

Actual Deaths by Certain Diseases, According to Nativity of

CAUSES OF DEATH, AND DEATHS IN INSTITUTIONS.	PLACE OF BIRTH OF DECEASED.														
	Austria-Hungary.	Bohemia.	British America.	England.	France.	Germany.	Ireland.	Italy.	Poland.	Russia.	Scotland.	Switzerland.	United States.	Other Nationalities.	Unknown Nationality.
Total—All causes..........	558	206	197	778	247	4,096	6,030	912	43	751	253	134	26,412	625	380
Diphtheria................	5	..	6	6	3	6	5	9	..	9	4	1	1,497	3	1
Measles....................	7	..	1	..	..	1	5	6	..	3	..	..	683	3	5
Scarlet fever...............	1	..	..	5	1	3	4	1	..	3	2	..	377	3	2
Diarrheal diseases..........	8	2	3	9	1	52	124	26	..	14	3	2	2,613	5	12
Cancer....................	36	13	12	52	15	279	276	33	1	57	11	7	325	21	3
Insanity...................	6	3	1	16	4	50	58	10	1	12	7	2	80	8	..
Heart diseases.............	55	25	20	72	34	473	544	75	10	74	30	13	922	31	18
Phthisis...................	112	50	36	117	45	561	1,031	170	6	143	44	36	2,449	175	19
Pneumonia..................	59	23	21	88	19	368	767	164	1	50	21	14	3.714	61	13
Cirrhosis of liver and hepatitis..................	12	8	2	19	9	109	152	13	2	9	4	2	146	4	..
Bright's disease and nephritis.................	45	24	15	87	20	469	788	41	6	55	43	10	999	58	25
Old age....................	3	4	2	27	3	144	218	10	1	18	7	..	157	8	..
Alcoholism.................	3	5	4	18	2	38	107	5	..	1	3	3	153	5	13
Sunstroke..................	9	6	3	17	12	155	287	12	1	2	2	3	195	12	49
Homicide...................	1	..	..	2	..	10	7	7	..	3	..	..	38	..	3
Suicide....................	15	2	3	14	6	127	20	12	..	17	1	6	110	18	33
Inanition, atrophy, marasmus, etc.	..	..	..	..	..	1	1	..	..	..	..	..	1,365	..	23
Other causes...............	181	41	68	229	73	1,250	1,636	318	14	281	71	35	10,589	210	162
Died in Almshouse........	1	..	3	12	2	73	302	5	1	7	10	6	57	7	1
Died in institutions.........	212	31	67	306	113	1,202	2,126	275	17	342	104	63	5.534	282	151

Deceased, of Parents of Deceased, and Color, for the Year 1896.

PLACE OF BIRTH OF PARENTS OF DECEASED.																Total.	Colored.
Austria-Hungary.	Bohemia.	British America.	England.	France.	Germany.	Ireland.	Italy.	Poland.	Russia.	Scotland.	Switzerland.	United States.	Other Nationalities.	Mixed Nationalities.	Unknown Nationality.		
1,314	437	102	787	274	6,233	9,753	2,826	94	2,029	306	141	7,481	799	5,107	3,939	41,622	1,143
68	18	3	15	6	177	200	91	3	133	7	1	433	28	317	55	1,555	18
38	4	..	6	..	65	91	97	3	57	..	..	139	19	115	80	714	10
12	4	..	5	4	47	63	18	..	28	4	..	103	5	90	19	402	..
121	66	7	27	9	351	424	244	8	205	11	12	604	58	524	203	2,874	70
36	11	1	44	13	271	320	32	2	57	17	7	155	17	68	90	1,141	15
7	2	..	14	3	58	65	7	1	8	7	1	32	6	15	32	258	7
57	22	7	65	22	509	662	81	10	83	25	12	375	27	181	258	2,396	105
106	61	16	92	43	894	1,864	171	8	126	38	31	555	148	438	403	4,994	183
224	53	14	84	25	645	1,254	706	8	332	38	14	952	100	637	297	5,383	170
9	6	1	15	9	120	180	14	1	9	5	2	53	3	24	40	491	7
45	25	9	77	26	514	959	40	5	65	44	8	372	44	159	293	2,685	79
3	3	..	28	3	131	203	9	1	17	6	..	104	6	36	52	602	20
2	4	1	13	1	49	139	3	..	1	3	1	33	4	16	90	360	3
7	5	1	12	5	133	290	12	1	4	3	..	39	8	36	209	765	3
1	..	..	1	..	7	12	7	..	2	..	..	6	1	4	30	71	5
16	2	1	10	5	107	32	9	1	14	..	3	29	10	21	124	384	1
30	6	..	11	6	92	101	47	4	64	2	3	288	16	274	445	1,389	39
532	145	41	268	94	2,063	2,894	1,238	38	824	96	46	3,209	299	2,152	1,219	15,158	408
1	..	1	12	3	72	309	1	..	3	8	7	27	2	14	27	487	..
247	30	23	224	102	1,223	2,712	275	28	560	93	42	1,325	245	899	2,797	10,825	437

Actual Deaths from Zymotic and Certain other Preventable Diseases by Wards, for the Year* 1896.

WARDS.	Area in Acres.	Population by Police Census, April, 1895.	Number of Persons to the Acre.	Cerebro-spinal Meningitis.	Diphtheria.	Typhoid Fever.	Erysipelas.	Malarial Fevers.	Measles.	Scarlet Fever.	Small-pox.	Whooping-cough.	Diarrheal Diseases.	Rheumatism.	Phthisis.	Bronchitis.	Croup.	Pneumonia.	Puerperal Diseases.	Bright's Disease and Nephritis.	All Causes.	In Institutions not Redistributed.	† In Institutions Redistributed.	Total in Institutions.	Deaths of Children under 5 years.	‡ All Deaths Redistributed.
First	173.8	12,518	72.0	4	11	11	..	..	12	5	..	3	27	2	72	17	..	80	3	35	486	43	131	174	151	483
Second	78.0	1,038	13.3	1	..	..	..	..	..	..	..	..	2	..	4	1	..	1	..	1	48	..	17	17	6	52
Third	104.0	4,014	38.6	..	1	..	..	..	..	..	..	1	4	..	14	1	..	6	1	5	84	..	26	26	10	92
Fourth	83.3	18,405	220.9	1	10	2	2	1	8	2	..	4	33	1	91	36	2	129	4	46	635	1	174	175	260	692
Fifth	160.2	10,603	66.2	..	9	2	1	2	3	6	..	1	18	..	33	9	..	47	..	28	346	57	64	121	109	315
Sixth	101.1	22,897	226.5	2	12	2	4	..	7	3	..	2	26	..	115	40	5	103	1	33	587	3	126	129	233	637
Seventh	206.0	74,227	360.7	9	62	10	3	..	28	12	..	9	120	2	166	30	10	234	14	82	1,463	27	347	374	670	1,567
Eighth	177.1	31,374	177.2	2	43	6	3	4	11	13	..	7	50	1	100	51	3	94	12	61	826	1	160	161	339	900
Ninth	305.0	60,987	200.0	3	55	7	3	5	35	18	..	13	94	6	218	46	12	185	19	101	1,587	68	281	349	531	1,658
Tenth	109.0	70,165	643.8	9	59	5	4	..	30	6	..	9	97	1	120	24	7	203	11	61	1,195	1	400	401	616	1,303
Eleventh	213.0	86,722	407.1	2	60	10	8	..	37	9	..	18	105	3	175	53	5	230	14	87	1,622	35	316	351	755	1,732
Twelfth	5,937.0	361,412	61.6	41	258	50	20	31	147	94	..	85	525	21	872	239	46	912	89	458	7,812	813	1,000	1,813	3,198	7,638
Thirteenth	109.0	58,802	539.5	5	54	3	2	1	22	7	..	13	96	3	85	39	7	167	11	54	992	..	208	208	602	1,083
Fourteenth	108.0	31,904	295.4	1	33	7	4	4	34	3	..	13	86	3	125	120	7	214	14	35	1,038	..	196	196	589	1,133
Fifteenth	225.0	26,216	116.5	1	19	1	1	..	10	5	..	4	22	2	80	15	2	78	2	42	555	16	165	181	189	588
Sixteenth	318.0	57,430	180.6	5	34	13	1	1	11	10	..	11	61	3	165	20	5	151	13	110	1,265	26	315	341	364	1,341
Seventeenth	265.0	111,727	431.4	9	95	12	6	1	27	32	..	25	137	7	311	70	6	304	26	121	2,297	38	542	580	940	2,476
Eighteenth	500.0	67,459	134.9	8	79	11	6	3	14	18	..	11	74	6	191	34	6	184	5	120	1,572	158	344	502	532	1,543
Nineteenth	1,851.0	267,076	144.3	12	210	36	23	9	101	41	..	75	533	12	630	131	20	676	61	401	5,916	1,412	755	2,167	2,485	4,915
Twentieth	418.7	94,963	226.8	10	121	22	5	8	25	23	..	37	154	8	349	73	11	295	19	170	2,357	40	526	566	863	2,529
Twenty-first	380.0	72,144	189.9	3	66	10	2	4	21	10	..	11	82	7	206	48	6	221	15	133	1,735	257	323	580	558	1,613
Twenty second	1,681.0	194,893	115.9	35	162	48	13	9	80	64	1	37	276	9	441	114	35	507	48	313	4,158	105	676	781	1,676	4,423
Twenty-third	4,267.0	81,567	19.1	8	77	20	5	8	40	12	..	33	165	5	259	60	11	240	23	103	1,890	89	158	247	801	1,966
Twenty-fourth	22,255.8	43,508	1.9	7	25	9	6	21	11	9	..	13	87	5	171	21	2	119	11	81	1,156	292	93	385	321	943
Total	40,010.0	1,868,050	46.7	178	1,555	297	122	112	714	402	1	435	2,874	107	4,994	1,292	108	5,383	416	2,685	41,622	3,482	7,343	10,825	16,808	41,622

* Deaths in institutions redistributed according to residence, where residence was known.

Including portion of Westchester County, comprising 14,205.5 acres (preliminary estimate by Commissioner of Street Improvements), annexed June 6, 1895. Population of annexed territory was estimated at 17,000 on July 1, 1895, and is included in the population of the 24th Ward.

‡ In this column the 3,482 deaths in institutions, for which no previous or other residence was given in the certificate of death, have been distributed to the different wards in proportion to the number of deaths known to have been properly assigned to each ward.

METEOROLOGY. Mean baro	83	29.925	29.894	29.886	29.925	29.959	29.994
Mean hum	8	72	64	68	72	69	70
Maximum	86	90	81	86	90	86	87
Minimum	46	42	45	51	59	45	51
Inches of r	25	2.64	1.15	.27	.41	.65	.06
Mean temp	4°	75.0°	78.3°	82.2°	84.2°	69.0°	73.1°
Maximum	1°	86°	91°	97°	98°	85°	84°
Minimum t	[illegible]	65°	63°	68°	73°	57°	59°

CAUSE		July 25.	Aug. 1.	Aug. 8.	Aug. 15.	Aug. 22.	Aug. 29.
Total all cause	22	856	883	809	1,810	822	736
Influenza	..	..	1	..	1	..	..
Cerebro-spinal	4	5	6	1	5	3	2
Diphtheria	23	24	24	21	32	12	18
Erysipelas	..	2	2	1	1	..	2
Malarial fever	1	..	3	1	4	3	..
Measles	19	6	7	8	9	5	5
Scarlet fever	6	5	3	4	2	1	2
Small-pox	..	..	..	..	..	..	..
Typhoid fever	4	7	7	9	15	10	6
Whooping-cou	4	10	15	13	8	7	14
Cholera morb	7	3	2	5	4	1	..
Other diarrhe	35	177	162	164	190	133	116
Diarrheal dise	73	158	143	143	168	122	106
Other zymotic	6	5	2	5	6	4	6
Cancer	23	19	19	18	21	27	16
Rheumatism	..	2	1	2	1	1	1
Phthisis	82	81	87	66	114	87	105
Other constitu	29	30	25	21	32	17	24
Apoplexy	22	17	21	31	42	20	9
Convulsions	16	13	10	4	24	10	6
Meningitis an	26	14	19	20	34	25	15
Other disease	20	19	17	14	33	23	18
Aneurism	..	..	2	1	..	..	1
Heart diseases	50	31	34	32	61	37	28
Other disease	2	..	1	4	5	1	..
Bronchitis	11	15	17	9	22	15	19
Croup	1	2	2	3	..	2	1
Pneumonia	53	51	57	35	61	46	49
Other disease tem	6	9	8	8	10	6	9
Gastritis, gas and periton	17	72	68	59	98	73	58
Cirrhosis of li	11	6	16	13	8	8	8
Other disease	19	24	32	12	21	12	18
Bright's disea	55	48	60	46	85	42	43
Other urinary	3	4	4	4	8	3	6
Premature an cyanosis an	21	31	21	26	23	14	28
Puerperal dis	11	4	3	7	12	4	7
Old age	10	12	9	8	34	16	13
Alcoholism	7	3	4	4	11	8	4
Sunstroke	20	1	5	11	648	66	1
Accident	57	33	46	67	710	101	28
Homicide	1	2	2	3	2	1	..
Suicide	6	8	13	11	8	5	7
Under 1 mon	60	76	65	59	70	49	59
One month, a	39	252	245	219	321	206	198
Total under 5	05	443	427	388	557	365	362
65 years and	80	76	70	80	226	87	70
Males	73	488	499	434	1,059	458	401
Females	49	368	384	375	751	364	335
Colored	25	21	25	13	34	24	14
Death-rate	23	23.05	23.76	21.76	48.65	22.08	19.76
Institutions	24	217	229	216	436	202	170
Tenements	30	527	531	502	1,134	521	490
Dwellings	11	81	97	61	156	72	56
lotels, et	8	10	7	7	29	11	3
thers	5	21	19	23	55	16	11

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Deaths by Suicide During the Year 1896.

NATIVITY.	Cuts and Stabs.		Gunshots.		Hanging.		Strangulation.		Leaps.		Leap down three flights of stairs.		Leap in front of Elevated R. R. Train.		Leap in front of Engine of N.Y., N.H.& H. R.R.		Drowning.		Illuminating Gas.		Suffocation by Charcoal Fumes.	
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
Austria-Hungary	1	..	4	..	2	1	..	..	..	2	..	..	..	..	..	..	..	..	1	..	..	..
Bohemia	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
British America	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
England	..	..	6	..	..	..	..	..	1	..	..	..	..	..	..	..	1	..	1	..	..	..
France	..	..	1	..	1	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..
Germany	3	..	45	1	23	1	..	1	1	1	..	..	..	..	..	..	2	2	9	1	..	..
Ireland	2	..	2	..	2	..	..	..	..	1	..	..	..	..	..	..	..	..	1	1	..	..
Italy	..	..	5	..	..	..	..	..	3	..	..	..	1	..	..	..	..	1	..	..	..	..
Russia	..	..	4	..	4	1	..	..	1	..	..	..	..	..	..	..	..	..	1	..	..	..
Scotland	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Switzerland	..	..	2	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..
Other Foreign Countries	1	..	4	..	3	..	..	..	..	..	..	..	..	1	..	..	1	..	1	..	1	..
United States	6	1	24	5	11	1	..	..	5	1	..	1	1	..	..	..	..	2	11	6	..	..
Unknown	2	..	15	1	3	..	..	..	..	..	..	..	..	..	1	..	3	..	..	1	..	..
Total	15	1	114	7	50	4	..	1	11	5	..	1	3	1	1	..	7	5	25	10	1	..

NATIVITY.	Carbon Monoxide.		Alcohol.		Arsenic.		Paris Green.		Rough-on-Rats.		Bichloride of Mercury.		Bromide of Potash, Hydrate of Chloral.		Carbolic Acid.		Cyanide of Potassium.		Hydrocyanic Acid.		Lime Chloride.		Muriatic Acid.	
	M.	F.	M.	F.	M.	F.	M	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
Austria-Hungary	..	..	..	..	..	..	1	1	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..
Bohemia	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..
British America	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..
England	..	..	..	..	..	..	..	..	..	..	..	..	1	..	3	1	..	..	..	..	..	..	..	..
France	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	1	..	..	..	..	..	..	..
Germany	..	..	..	..	1	..	8	5	2	..	..	..	..	..	12	3	..	..	..	..	..	..	1	..
Ireland	..	..	..	..	..	..	..	3	..	..	..	..	..	..	2	6	..	..	..	..	..	.	..	..
Italy	..	..	..	..	..	..	1	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..
Russia	1	..	..	..	..	..	..	1	..	..	..	..	..	..	3	..	..	..	..	..	..	..	..	..
Scotland	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Switzerland	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Other Foreign Countries	1	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	1	..	..	..
United States	1	1	1	..	..	..	1	2	..	..	..	1	..	..	5	15	1	..	1	..	..	..	..	..
Unknown	..	..	..	..	..	..	..	..	..	..	..	..	..	..	3	1	..	..	1	..	..	..	..	..
Total	3	2	1	..	1	..	11	13	2	1	..	1	1	..	30	28	3	..	2	..	1	..	1	..

Deaths by Suicide During the Year 1896—(Continued).

NATIVITY.	Nitric Acid.		Oxalic Acid.		Morphine.		Opium.		Strychnine.		Irritant Poison.		Poisonous Drugs to induce Abortion.		Acute Poison not Specified.		Total by Sexes.		Total of Both Sexes.
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	
Austria-Hungary	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	10	5	[illegible]
Bohemia	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	1	[illegible]
British America	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	2	1	[illegible]
England	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	13	1	[illegible]
France	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	6	..	[illegible]
Germany	..	..	1	..	1	..	..	..	1	..	..	1	..	..	..	..	110	16	[illegible]
Ireland	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	9	12	[illegible]
Italy	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	11	1	[illegible]
Russia	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	15	2	[illegible]
Scotland	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	[illegible]
Switzerland	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	2	3	[illegible]
Other Foreign Countries	..	..	..	..	1	..	..	..	..	..	..	..	..	1	..	..	15	3	[illegible]
United States	1	..	..	1	..	..	..	1	..	..	..	2	..	..	..	..	69	40	[illegible]
Unknown	..	..	..	..	2	..	1	1	..	..	..	..	..	..	..	..	31	4	[illegible]
Total	1	..	2	2	6	..	2	2	1	..	..	3	..	1	..	1	295	89	[illegible]

Ages of Suicides During the Year 1896.

NATIVE.		FOREIGN.		10–15 YEARS.		15–25 YEARS.		25–45 YEARS.		45–65 YEARS.		65 YEARS AND OVER.		TOTAL BY SEXES.		TOTAL OF BOTH SEXES.
M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	
68	40	227	49	2	.	31	20	136	47	105	17	21	5	295	89	384

Deaths of Persons 100 *Years of Age and Over, During the Year ending December* 31, 1896.

DATE OF DEATH.		NAME.	AGE.			NATIVITY.	CAUSE OF DEATH.
			Years.	Months.	Days.		
Aug.	12	Ernestine Solomon	101	..	..	Germany	Old age.
"	13	Catherine Clark	103	1	19	Ireland	Sunstroke.
Oct.	21	Rubin Rosenthal	101	..	..	Russia	Old age.
Dec.	8	Nathan T. Webb	100	..	..	United States	"
"	29	Mary O'Connor	102	..	..	Ireland	Emphysema and Asthma.

Deaths by Accident and Negligence During Year ending December 31, 1896.

Fractures and contusions (not defined)	57
Crushed—	
Between elevater and top of door	1
" elevator and roof	1
" elevator and sidewalk	1
" two boats	1
Beneath wagon by breaking of axle	1
At work at Croton Dam	1
By falling building	2
" safe	1
" stone	5
" timber	4
By coal shoot	1
By cylinder of hoisting-machine	1
By counter-weight of elevator	1
By elevator	14
By rope wound about body	1
By truck falling on him	1
By walking-beam of ferry-boat	1
By iron pipe while at play	1
Cake of ice falling on him	1
Caving-in of excavation	1
Caught in fly-wheel of engine	1
Iron girder falling on him	1
Iron falling on him	1
Injury to toe	1
Finger caught in cog-wheel of machinery	1
Rupture of liver (fall into excavation, Park avenue and 113th street)	1
Struck by—	
Falling tree	1
" bucket	1
" block	1
" flask in foundry	1
" iron beam	1
" plank	2
" piece of machinery	1
Board from circular saw	1
Derrick	2
Hod elevator	1
Base-ball bat	1
Boom of derrick	1
Stone from blast	2
Elevator	1
Crank of fly-wheel	1
Fellow-workman thrown against him by falling barrel	1
Tackle on steamer	1
Piece of timber	2
Block of rigging on ship	1
Struck on head—	
By bucket	1
By falling weight	1
" chair	1
Said to have been assaulted at Insane Asylum	1
Stone falling on him	1
Striking against—	
Asphalt roller	1
Stone	1
Scaffold falling upon him	1
Falls—	
From building	19
" bed	4
" bed in epileptic fit	1
" chair	6
" fire-escape	28
" fifth floor	1
" fifth story, between banisters	1
" fourth floor	1
" gang-plank	1
" hammock	2
" hatchway	2
" ladder	5
" plank	1
" rigging	1
" roof	33
" scaffold	13
Falls—	
From stoop	11
" stairs of "L" Station	1
" third story	1
" wall into area	1
" window	66
" wall of reservoir	1
" vinegar vat	1
" yard-arm of ship	1
" tree	1
Down area	3
" air-shaft	13
" basement	2
" cellar steps	2
" elevator	12
" embankment	1
" hatchway	1
" hold of vessel	4
" steps	1
" stairs	53
" stairway, well	1
In hallway	1
In street	12
Into basement	2
Into cut of New York Central and Hudson River Railroad	1
Into cellar	2
" excavation	1
" sewer	1
" sewer excavation	1
Of 20 feet	1
On board ship	1
" floor	5
" ice	1
" tub	1
Over railing	1
Through baluster	2
" railing into basement	1
Upon iron railing	1
With elevator	1
Not defined	53
Overcome by heat in power-house	1
Strangulation, caught in transom over door while at play	1
Struck by lightning	1
Electric light, No 243 Grand street	1
" current, Bowery near Broome street	1
" " Union square and W. 14th street.	1
Catching hold of live wire, northwest corner 18th street and Third avenue	1
Horses—	
Bite of	1
Kicked by	4
Knocked down by	4
Fall from	2
Thrown from	2
Trodden by horse hoofs	1
Drowning in rivers	207
" in old cistern	1
" in tub while playing	1
" in water closet	1
" in washtub	1
" in pail of water	1
Effects of immersion	1
Neglect and exposure	7
Sunstroke	765
Heat exhaustion, while working in heated room	1
Criminal abortion	5
Wounds of—	
(Not defined)	1
Foot, cutting corn, gangrene	1
" laceration of	1
" stepping on rusty nail	1
" and leg, gangrene of, cutting corn on ball of foot	1
Thumb	1
" caught in machinery	1

Wounds of—	
Hand	1
“ from pistol	1
“ while at work	1
Throat while playing with a stick	1
Leg, laceration from barbed wire	1
Clitoris, laceration from fall across chair	1
Finger	1
“ handling beer barrel	1
Knee by splinter of wood while crawling on floor	1
Arms, gangrene of, septicæmia	1
Thigh, falling on cotton hook	1
Tongue, exsanguination following	1
Lung, punctured	1
Fall on circular saw	1
Iron picket falling upon him	1
Pistol shot	8
Explosions of—	
Boiler	1
Dynamite blast	1
Kerosene	1
Oil-lamp	1
Premature blast	2
Soda-water fountain	1
“ siphon filler	1
Suffocation by—	
Choked at dinner by a fig	1
Cat lying upon chest	1
Excavation of sewer	1
Fall into pail of water at birth	1
Food lodged in larynx	6
Foreign body in larynx	1
Fire and smoke, No. 10 Christopher street	1
“ “ No. 77 East 10th street	1
“ “ No. 374 Hudson street	1
Inhalation of sewer gas	1
Lying on face while in epileptic fit	1
Marble in trachea	1
Overlaid	35
Regurgitation of food in trachea	1
Poison by—	
Arsenic	1
Carbolic acid	4
Carbon monoxide	4
Caustic potash	1
Chloroform	1
“ (operation)	2
Chronic chloralism	1
Cocaine and opium	1
Cyanide of potassium	1
Ether (operation)	1
Coal-gas, 83d street and Western Boulevard	1
Jamaica ginger, excessive use of	1
Lead	2
“ and zinc	1
Mercury, bi-chloride of	1
Morphine	16
Narcotic	1
Oil of turpentine	1
Opium	6
Overdose of chloral	1
Paris green	1
Phosphorus	2
Scheele's green	1
Strychnine	1
Tansy to produce abortion	1
Illuminating gas at—	
No. 810 Columbus avenue	1
No. 1937 Madison avenue	1
No. 1211 Tremont avenue	1
No. 954 Columbus avenue	1
No. 51 Third avenue	1
No. 1933 Third avenue	1
No. 2322 Third avenue	1
No. 263 Seventh avenue (hotel)	2
Pelham and Hull avenues	1
St. Ann's avenue and 14[illegible]th street	1
No. 122 Washington place	1

Illuminating gas at—	
No. 166 Maiden Lane	1
No. 276 Cherry street	1
No. 239 Bleecker street	1
No. 703 Greenwich street	1
No. 1009 Lebanon street	2
No. 93 Liberty street	1
No. 105 South street	1
No. 68 West street	1
No. 130 Stanton street	1
No. 119 Second street	1
No. 590 Seventh avenue	1
No. 420 East 5th street	1
No. 3 East 12th street	1
No. 145 East 18th street	1
No. 300 East 34th street	1
No. 150 East 41st street	1
No. 309 East 52d street	1
No. 104 East 81st street	1
No. 224 East 85th street	1
No. 50 East 89th street	1
No. 111 West 16th street	1
No. 149 West 21st street	1
No. 102 West 39th street	1
No. 125 West 45th street	1
No. 40 West 55th street	1
No. 159 West 84th street	1
No. 245 West 124th street	1
No. 413 West 125th street	1
No. 60 West 131st street	1
Burns by—	
Burning curtain	1
Clothes fired by bonfire	4
“ candle	3
“ gas-stove	5
“ live coals	1
“ matches	9
“ not specified	5
“ lighted paper, playing with	1
“ stove	20
“ while at play	1
Explosion of benzine while cleaning bed	1
“ gasoline stove	1
“ kerosene lamp	2
“ lamps	7
Fall into furnace	1
“ vat of molten metal	1
Fire crackers	1
Gasoline explosion	1
Not defined	34
Playing with fire	1
Naphtha	1
Turpentine	1
At fire No. 465 Greenwich street	3
“ No. 7 Pelham street	1
“ No. 28 Orchard street	1
“ No. 374 Hudson street	3
“ No. 514 East 58th street	5
“ No. 324 West 53d st	1
Scalds by—	
Beef-tea	1
Boiling tomatoes	1
Explosion of steam-pipe	1
Steam	1
Soup	4
Starch	1
Tea	4
Water	30
Not defined	11
Killed by street vehicles—	
Caught between truck and stanchion	1
“ seat of truck and archway	1
“ pole of truck and wagon	1
Caught under shed while driving out	1
Crushed by truck	1
“ ice wagon	1
“ wagon against building	1
Collision with express wagon	1
Falls from trucks, carts, etc	20

Killed by street vehicles—	
Fall over shaft of wagon	1
Fall from bicycle	2
Head caught between wall and wheel of wagon	1
Knocked down by wagon	2
Squeezed between wagon and building	1
Struck and knocked off bicycle	1
Thrown from wagons, carriages, etc.	5
Wagons, carts, trucks, etc.	67
While unloading truck	1
Killed by railroads—	
New York Central and Hudson River R. R.	22
New York, New Haven and Harlem R. R.	17
" Putnam R. R.	2
West Shore R. R.	1
Train of Jerome Park R. R.	1
Cars in Grand Central yard	1
Crushed between cars, Grand Central Depot.	1
" freight cars	1
Jammed between two railroad cars	1
Union trolley	4
Brooklyn trolley	1
Third avenue and 145th street, trolley	1
Thrown from wagon and struck by Union trolley	1
Cable cars:	
Amsterdam avenue line	1
Broadway line	3
Columbus avenue line	3
Lexington avenue line	7
Third avenue line	14
Dragged by Third avenue cable car and striking head against pillar of "L" R. R.	1
Elevated Railroad:	
Third avenue line	2
Ninth avenue line	4
Crushed between cars and platform of Metropolitan "L" R. R.	1
Thrown against "L" pillar from Trolley Third avenue, 150th street	1
Thrown against pillar of "L" R. R. while getting off trolley car, 148th street and Third avenue	1
Horse cars:	
First Avenue line	1
Second Avenue line	4
Madison Avenue line	2
Canal Street line	2
Eighth Street Crosstown line	1
Twenty-eighth Street Crosstown line	1
Killed by railroads—	
Horse cars:	
Avenue D line	1
Dry Dock, East Broadway and Battery line.	2
East Broadway and Avenue C line	1
Manhattanville and St. Nicholas Avenue line.	1
Knocked down and dragged by Avenue C car	1
Line not defined	2
Avenue B line	1
Homicide by—	
Blows	16
Cut, stab	17
Found in dumping-scow—infanticide	1
Infanticide	2
Kick	1
Pistol	30
Strangulation	3
Strangulation—infanticide	1

RECAPITULATION.

Fractures and contusions	135
Falls	385
Overcome by heat in power-house	1
Heat exhaustion while working in heated room	1
Strangulation, caught in transom over door while at play	1
Struck by lightning	1
Electric currents	4
Horses	14
Drowning	213
Neglect and exposure	7
Sunstroke	765
Criminal abortion	5
Wounds	30
Explosions	8
Suffocation	53
Poison	54
" (illuminating gas)	42
Burns	116
Scalds	55
Killed by street vehicles	109
" " railroads	47
" " cable cars	29
" " elevated railroads	9
" " trolley cars	7
" " horse cars	20
*Total accidents and negligence	2,111

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* Exclusive of 530 surgical operations. See special table.

Deaths from Surgical Operations for Year Ending December 31, 1896.

	Sex and Ages.	
	Males.	Females.
Amputation for cancer of breast	....	30, 35, 40, 45
" " tongue	40, 60, 60	....
" for lacerated cervix	....	40
" for osteo-sarcoma of leg	....	50
" for sarcoma of shoulder	30	50
" for septic condition of forearm	50	....
" of breast	....	45, 50
" of foot	70	....
" of leg, cellulitis, necrosis of tarsus	45	....
" " for gangrene	65	....
" of stump	....	50
" of thigh	45, 50	....
" " complicated fracture, gangrene	5	....
" " necrosis	....	60
" " gangrene of foot	....	60
" " suppurative arthritis of knee joint	40	....

	Sex and Ages.	
	Males.	Females.
Abdominal section, ventro-fixation of uterus	....	40
Anastomosis for intussusception of ileo-cœcal valve, caput coli and entire colon	....	—y
Anastomosis of intestine, for volvulus	....	25
Cæsarian section	....	20
“ and inguinal colotomy, peritonitis	....	25
“ for rupture of uterus	....	20, 30
Circumcision	—m, —m, —m, —m, —m, —m, —y, —y, —y	....
Cholecystomy, empyema of bladder	65	35
“	....	35
Colostomy, intestinal obstruction	....	55
Colotomy, inguinal	45	....
“ “ intestinal obstruction	45	....
“ cancer of rectum	50	....
Craniotomy	....	5
“ exploration for bullet in brain	65	....
“ for traumatic epilepsy, encephalitis	20	....
“ linear	3	....
“ microcephalus	....	—y
Curetting, abortion	....	20
“ endometritis	....	25, 30
“ of uterus for macerated fœtus	....	30
“ “ metrorrhagia, due to sub-mucous fibroids	....	30
“ puerperal septicæmia	....	20, 25
Cystotomy, hypertrophied prostate	60	....
“ nephritis, calculus	30	....
“ supra-pubic	65, 80	....
“ “ cancer of prostate gland	65	....
Epicystomy	....	20
Excision of cervical glands, tubercular cervical adenitis, hemorrhage	....	10
“ for congenital cystic adenoma of neck	—y	....
“ for cancer of rectum	70	45
“ for tumor, sarcoma of brain	35	....
Extirpation of vascular sarcoma of gluteal region, shock	....	—y
Hysterorrhaphy, prolapsus uteri	....	55
Hysterectomy	....	25, 30, 35, 35, 40, 45
“ abdominal, for fibroids	....	25, 25, 30 30, 30, 35, 35, 35, 40, 40, 45, 45, 45, 50, 50, 55, 60
“ “ pelvic tumor	....	35
“ “ pyæmia, septicæmia	....	15
“ cancer of uterus	....	40, 40, 40, 40, 45, 45, 50, 60
“ disease of uterus	....	35
“ ectopic gestation	....	25
“ hæmatoma-salpinx	....	35
“ ovarian abscess	....	35
“ rupture of old streptococcus, pyosalpinx	....	35
“ supra-pubic, general sepsis	....	30
“ syphilitic degeneration of ovaries and uterus	....	30
“ salpingitis	....	25, 25, 30
“ tubercular pyosalpinx	....	25
“ tubo-ovarian abscess	....	25, 35
“ vaginal, cancer of uterus	....	35, 40, 40, 50, 50
“ “	....	20, 20, 40
“ “ and abdominal, endometritis, pyosalpinx	....	20
“ “ double, pyosalpinx	....	20, 35
“ “ vagino-abdominal	....	55
Lithotomy—sepsis following	60, 65	....
Litholapaxy, acute nephritis, amyloid kidney, œdema of brain, calculus	70	....
Ligation of external carotid during removal of cancer of tonsils and glands	25	....
Laparotomy	....	30, 40, 40
“ aneurism of abdominal aorta	55	....
“ cancer	45	30
“ “ of abdomen	....	30
“ “ of kidney	....	4
“ “ liver	50	....
“ “ uterus	....	35, 40

	Sex and Ages.	
	Males.	Females.
aparotomy exploratory	25	30, 40
" intestinal obstruction	10, 20, 65	—m, 25, 45
aparotomy, secondary, for hemorrhage after abdominal hysterectomy, fibroid tumor, shock	....	30
aparatomy, salpingitis	....	20, 25, 25, 30, 30, 30, 35, 40
" removal of uterus	....	45
" extra-uterine pregnancy	....	30, 35
" fibroid uterus	....	30, 35, 40, 40
" intra-peritoneal abscess	....	35
" pelvic abscess, post-puerperal	....	25
" "	....	45
" peritonitis chronic	....	40
" prolapsus uteri	....	40, 40
aparotomy, post-partum sepsis, removal of uterus, peri-nephritic abscess	....	20
aparotomy, papilloma ovarii sinistri	....	35
ephorrhaphy—Grave's disease of nerves	....	35
ephrectomy, pyonephrosis	35, 50	25, 25, 45
" tubercular kidney and bladder	25	....
öphorectomy	....	25, 35
" double-tumor, sub-peritoneal fibroid	....	30
" hydrosalpinx	....	20
" mania, acute	....	40
" salpingo, septic peritonitis	....	30
steotomy	10	....
variotomy, double	....	30, 30, 60
peration, abscess of brain	45	....
" " ischio-rectal	50	....
" " of prostate	40	....
" " peri-nephritic	10	....
" " sub-aural	....	15
" appendicitis	10, 15, 15, 15, 15, 15, 20, 20, 20, 20, 20, 20, 25, 25, 25, 25, 35, 35, 50, 60.	—w, 5, 5, 5, 10, 10, 10, 15, 20, 20, 25, 25, 25, 35, 35, 45, 45, 50, 55.
" (Alexander's)	....	25
" atresia-recto-vesicalis	—y	....
" childbirth, hemorrhage, shock	....	35
peration, childbirth, contracted pelvis, prolonged instrumentation, shock	....	30
peration, childbirth, podalic version	....	25, 35
" cleft palate	....	—y
" Charcot joint, locomotor ataxia	45	....
" cancer of breast	....	25, 40, 40, 50, 50, 50, 55, 65, 70
" " brain	....	20
" " bladder	60	....
" " cervix uteri	....	35
" " cœcum	....	40
" " gall bladder	....	50
" " gluteal region	....	45
" " jaw	15, 15, 50	....
" " larynx	50, 50	....
" " leg	....	20
" " liver	....	50
" " neck	10	60
" " —not defined	55	60
" " ovaries	....	45, 50, 55
" " " premature labor	....	20
" " rectum	40, 60	....
" " stomach	45, 65	35
" " thigh	....	65
" " tongue	65	40
" " uterus	....	35, 35, 40, 45, 50, 60
" cystic tumor of abdomen	....	65
" " broad ligament	....	40, 45
" caries of rib	60	....
" deformity following burns, hyperpyrexia	5	....
" empyema	—y, —y, —y, 1, 1, 1, 1, 2, 3, 4, 5, 30, 45	20, 35
" ectopic gestation	....	25, 25, 25, 40
" effusion in pericardial sac, ovarian cyst	....	40

	Sex and Ages.	
	Males.	Females.
Operation, enchondroma of os innominatum	25	....
" enlarged prostate	60, 75	....
" entero-utero-vesical fistula	....	40
" gall stones, cholelithiasis	50, 50	50
" gangrenous peri-proctitis	50	....
" general peritonitis	15	20, 25
" glioma of brain	40	....
" hernia	20, 50, 60	45
" " inguinal	20, 40, 50, 60, 75	....
" " " irreducible	50	....
" " incarcerated	75	....
" " femoral	....	65
" " strangulated	20, 35, 60, 60, 70, 75	45, 65
" " " umbilical	....	40, 50, 60
" " " " resection of transverse colon	....	55
" " ventral	65	25, 40, 60
" hip disease	15, 30	5
" hydatid mole	....	25, 40, 45
" hydrencephalocele	—w	—y
" intestinal intussusception	—y, —y, —y, 5	....
" " obstruction	5, 5, 10, 20, 25, 50, 60, 60, 60, 65	—y, 5, 20, 25, 3 35, 45, 55
" " " congenital stenosis of descending colon.	....	—m
" imperforate anus	—w, —m	....
" lymphangioma of face	—m	....
" ovarian abscess	....	20, 20, 25, 25, 30, 3 30, 35, 35.
" " cyst	....	15, 20, 25, 25, 25, 25, 30, 30, 35, 4 40, 40, 45, 45, 5 30, 50.
" " dermoid	....	15, 25, 35.
" old hip dislocation	30.	....
" osteomyelitis	10, 10.	....
" on penis, erysipelas	—m	....
" papillomata of larynx	2.	....
" papilloma of bladder	....	35.
" peritonitis, acute, fœcal fistula	....	25.
Operation peritonitis, chronic, following incomplete ovariotomy 7 years ago	....	30.
Operation pyosalpinx	....	20, 20, 20, 20, 25, 2 25, 25, 25, 25, 3 30, 30, 30, 35, 4 40, 35, 35, 35, 3
" phthisis, incipient, rectal abscess	....	20.
" prolapsus uteri	....	40, 40, 50.
" pelvic tumor	....	20, 45.
" puerperal septicæmia	....	20, 25, 30.
" periurethral abscess	35.	....
Operation reduction of old dislocation of shoulder, secondary operation, amputation of arm, septicæmia following thrombosis of tracheal veins.	....	65.
Operation recto-vaginal fistula, shock	....	35.
" removal of glands	....	1.
" relief of paresis, cyst of cerebrum	....	5.
" retroversion of uterus	....	20, 35.
" septicæmia, acute peritonitis	....	30.
" stone in bladder	70.	....
" stricture of stomach	....	40.
" splenectomy, leukæmia	50.	....
" spina bifida	—y	—y
" suppurative adenitis of neck	40.	....
" " knee	1.	....
Operation because of pelvic pain, suppuration of peritoneal adhesions, oöphorectomy double 5 months ago	....	30.
Operation suppression of urine	20.	....
" tubercular salpingitis	....	30.
" " glands of neck	2.	3, 20.
" " peritonitis	25.	....
" " pelvic abscess	....	35.
" tuberculosis of bladder	35.	....
" " knee	35, 45.	5.
" thoracic fistula	40.	....
" tumor of brain	....	5, 40.

	Sex and Ages.	
	Males.	Females.
Operation, uterine fibroid	....	20, 25, 25, 25, 30, 35, 35, 35, 35, 40, 40, 40, 45, 45, 45, 45, 50, 55, 60, 40.
" " tubo-ovarian cyst	....	40.
" uterus and ovaries	....	45.
Perineorrhaphy, pneumonia	....	35.
Staphylorrhaphy	—y	....
Tapping lateral ventricle, hydrocephalus	....	—y
Tracheotomy	40.	....
" cellulitis of neck and larynx	30.	....
Tracheotomy, foreign body in bronchi at bifurcation, a pin pushed through a pea, septic pneumonia	10.	....
Tracheotomy, acute cervical adenitis, broncho-pneumonia	—y	....
" laryngismus	5.	....
Trephining for traumatic epilepsy	20.	....
Urethrotomy, external perineal for stricture, malignant œdema	30.	....
" stricture of urethra	20, 55, 60.	....
Vaccination	1.	—y
Total by sexes	180.	350.

NOTE. —w under one week; —m under one month; —y under one year.

Deaths in Institutions During the Year 1896.

Almshouse	487	New York Hospital	355
Babies' Hospital	87	North Brother Island Hospital	92
Bellevue Hospital	1,648	Nursery and Child's Hospital	155
City Hospital	436	Polyclinic Hospital	48
Colored Home Hospital	120	Post-Graduate Hospital	245
Ellis' Island Emigrant Hospital	42	Presbyterian Hospital	315
Flower Hospital	64	Randall's Island Hospital	78
Fordham Hospital	78	Reception Hospital	38
Foundling Asylum	615	Roosevelt Hospital	372
French Hospital	57	St. Francis' Hospital	180
German Hospital	157	St. John's Guild	55
Gouverneur Hospital	219	St. Joseph's Hospital	492
Hahnemann Hospital	24	St. Luke's Hospital	159
Harlem Hospital	211	St. Vincent's Hospital	251
Home for Aged (Little Sisters of the Poor)	85	St. Mark's Hospital	61
Home for Incurables	59	Skin and Cancer Hospital	74
House of Relief (Hudson Street)	174	Sloane Maternity Hospital	53
House of Nazareth	32	Willard Parker Hospital	240
Infants' Hospital (Randall's Island)	471	Woman's Hospital	36
Manhattan State Hospital	698	Workhouse	48
Metropolitan Hospital	433	Wright's Memorial Hospital	142
Montefiore Home	107	Other institutions	721
Mount Sinai Hospital	305		
		Total	10,825

RECAPITULATION.

Prisons	109	Almshouse	487
Hospitals	8,530	Other institutions	74
Manhattan State Hospital for Insane	698		
Institutions for children	703	Total	10,825
Homes for aged	224		

Deaths by Age and Sex and Percentage of Each Age Period to Total Mortality during the Year 1896.

TOTAL NUMBER OF DEATHS.

Age.	Jan.		Feb.		Mar.		Apr.		May.		June.		July.		Aug.		Sept.		Oct.		Nov.		Dec.		Total.	
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
Under 1 year..........	429	331	405	239	479	389	495	423	394	331	557	480	942	766	693	587	496	397	397	313	319	239	319	256	5,926	4,751
1 to 5 years............	311	335	302	271	336	313	330	330	278	331	274	234	286	300	287	265	220	198	170	146	163	125	184	141	3,141	2,989
5 to 10 years............	49	49	57	54	49	50	53	61	54	61	58	53	46	44	42	28	34	34	37	36	40	38	43	42	562	550
10 to 15 years..........	20	19	18	22	11	19	17	26	14	22	17	20	24	20	31	25	13	19	16	17	12	10	11	11	204	230
15 to 20 years..........	39	39	30	31	43	31	32	43	33	40	32	36	32	35	35	34	32	35	30	34	32	29	31	23	401	410
20 to 25 years..........	76	77	68	75	88	81	65	62	74	75	67	71	53	67	83	74	67	75	66	62	51	56	63	66	821	841
25 to 35 years..........	233	194	215	162	248	159	237	182	224	170	149	150	208	140	311	172	191	127	147	143	166	137	210	184	2,559	1,918
35 to 45 years..........	231	148	233	146	254	151	240	146	214	153	163	109	206	145	334	148	194	136	196	132	172	136	198	129	2,635	1,679
45 to 55 years..........	217	133	179	123	242	164	219	153	187	145	155	111	178	114	285	177	144	111	167	122	181	109	170	132	2,324	1,594
55 to 65 years..........	188	143	190	143	199	166	200	172	155	132	137	102	143	137	187	205	134	108	146	120	129	111	154	117	1,962	1,656
65 to 75 years..........	130	127	138	129	132	143	116	134	111	102	100	92	104	101	146	173	88	102	113	102	98	103	94	114	1,370	1,422
75 years and over......	45	94	61	87	64	102	63	93	58	96	50	64	60	63	81	96	44	60	56	95	57	61	48	79	687	930
Total..........	1,968	1,689	1,897	1,482	2,145	1,768	2,087	1,825	1,796	1,658	1,759	1,522	2,282	1,932	2,515	1,982	1,657	1,402	1,541	1,322	1,420	1,154	1,525	1,294	22,593	19,030

PERCENTAGE OF EACH AGE PERIOD TO TOTAL MORTALITY.

Under 1 year..........	1.03	.80	.98	.57	1.15	.93	1.19	1.02	.95	.80	1.34	1.15	2.26	1.84	1.66	1.41	1.19	.95	.95	.75	.77	.57	.77	.62	14.23	11.41
1 to 5 years............	.75	.80	.73	.65	.81	.75	.79	.79	.67	.80	.66	.56	.69	.72	.69	.64	.53	.48	.41	.35	.39	.30	.44	.34	7.54	7.18
5 to 10 years............	.12	.12	.14	.13	.12	.12	.13	.15	.13	.15	.14	.13	.11	.11	.10	.07	.08	.08	.09	.09	.10	.09	.10	.10	1.35	1.32
10 to 15 years..........	.05	.05	.04	.05	.03	.05	.04	.06	.03	.05	.04	.05	.06	.05	.07	.06	.03	.05	.04	.04	.03	.02	.03	.03	.49	.55
15 to 20 years..........	.09	.09	.07	.07	.10	.07	.08	.10	.08	.10	.08	.09	.08	.08	.08	.08	.08	.08	.07	.08	.08	.07	.07	.06	.96	.98
20 to 25 years..........	.18	.18	.16	.18	.21	.19	.16	.15	.18	.18	.16	.17	.13	.16	.20	.18	.16	.18	.16	.15	.12	.13	.15	.16	1.97	2.02
25 to 35 years..........	.56	.47	.52	.39	.60	.38	.62	.44	.54	.41	.36	.36	.50	.34	.75	.41	.46	.31	.35	.34	.40	.33	.50	.44	6.15	4.51
35 to 45 years..........	.55	.36	.56	.35	.61	.36	.58	.35	.51	.37	.39	.26	.49	.35	.80	.36	.47	.33	.47	.32	.41	.33	.48	.31	6.33	4.03
45 to 55 years..........	.52	.32	.43	.30	.58	.39	.53	.37	.45	.35	.37	.27	.43	.27	.68	.43	.35	.27	.40	.29	43	.26	.41	.32	5.58	3.83
55 to 65 years..........	.45	.34	.46	.34	.48	.40	.48	.41	.37	.32	.33	.25	.34	.33	.45	.49	.32	.26	.35	.29	.31	.27	.37	28	4.71	3.98
65 to 75 years..........	.31	.31	.33	.31	.32	.34	.28	.32	.27	.25	.24	.22	.25	.24	.35	.42	.21	.25	.27	.25	.24	.25	.23	.27	3.29	3.42
75 years and over......	.11	.23	.15	.21	.15	.25	.15	.22	.14	.23	.12	.15	.14	.15	.19	.23	.11	.14	.13	.03	.14	.15	.12	.19	1.65	2.38
Total..........	4.73	4.06	4.56	3.56	5.15	4.25	5.01	4.38	4.31	3.98	4.22	3.66	5.48	4.64	6.04	4.76	3.98	3.37	3.70	3.18	3.41	2.77	3.66	3.11	54.28	45.72

Deaths and Death-rate by Sex, Yeat 1896.

Months.	Number of Deaths.			Death-rate per 1,000 of Estimated Population.		
	Male.	Female.	Total.	Male.	Female.	Total.
January	1,968	1,689	3,657	12.21	10.48	22.69
February	1,897	1,482	3,379	11.77	9.20	20.97
March	2,145	1,768	3,913	13.31	10.97	24.28
April	2,087	1,825	3,912	12.95	11.32	24.27
May	1,796	1,658	3,454	11.14	10.29	21.43
June	1,759	1,522	3,281	10.91	9.44	20.36
July	2,282	1,932	4,214	14.16	11.99	26.15
August	2,515	1,982	4,497	15.60	12.30	27.90
September	1,657	1,402	3,059	10.28	8.70	18.98
October	1,541	1,322	2,863	9.56	8.20	17.76
November	1,420	1,154	2,574	8.81	7.16	15.97
December	1,525	1,294	2,819	9.46	8.03	17.49
Total	22,592	19,030	41,622	11.68	9.84	21.52

Births and Birth-rate by Sex, Year 1896.

Months.	Number of Births Registered	Birth-rate per 1,000.	Males.	Females.	Percentage of Males to Total.	Percentage of Females to Total.
January	4,694	29.12	2,358	2,336	50.23	49.77
February	4,547	28.21	2,270	2,277	49.92	50.08
March	4,862	30.16	2,525	2,337	51.93	48.07
April	4,413	27.38	2,211	2,202	50.10	49.90
May	4,169	25.87	2,069	2,100	49.63	50.37
June	4,246	26.34	2,215	2,031	52.17	47.83
July	4,741	29.41	2,405	2,336	50.73	49.27
August	4,684	29.06	2,399	2,285	51.22	48.78
September	4,792	29.73	2,452	2,340	51.17	48.83
October	4,929	30.58	2,440	2,489	49.50	50.50
November	4,446	27.59	2,253	2,193	50.67	49.33
December	5,100	31.64	2,647	2,453	51.90	48.10
Total	55,623	28.76	28,244	27,379	50.78	49.22

Interments of Deceased Persons for Six Years Ending December 31, 1896.

Location of Interments.	1891.	1892.	1893.	1894.	1895.	Average for 5 Years Preceding 1896.	1896.
City Cemetery	4,264	4,426	4,756	4,443	4,067	4,391.2	4,270
Cemeteries outside of New York City	37,675	38,150	37,985	35,189	37,689	37,337.6	34,495
Cemeteries inside of New York City	1,695	1,741	1,738	1,579	1,663	1,083.2	*2,887
Total interments	43,634	44,317	44,479	41,211	43,419	43,412.0	41,652
Percentage of pauper burials to total	9.77	9.99	10.69	10.78	9.37	10.11	10.25

* Exclusive of City Cemetery.

Table Showing Increase or Decrease from Certain Causes, Comprising about 81 per cent. of all Deaths, as Compared with Average Annual Number of Deaths for Previous Ten Years, Increased to Correspond with Increase of Population.

Cause of Death.	1886.	1887.	1888.	1889.	1890.	1891.	1892.	1893.	1894.	1895.	Average for 10 Years Preceding 1896.	Same Increased for Increase of Population.	Deaths in 1896.	Increase in 1896.	Decrease in 1896.
Small-pox	31	99	81	1	2	2	81	102	154	10	56.3	66	1	....	65
Measles	668	767	591	470	730	663	864	393	584	793	652.3	767	714	....	53
Scarlet fever	371	589	1,361	1,242	408	1,220	977	551	541	408	772.8	910	402	....	508
Typhus fever	14	....	4	....	....	1	45	200	....	....	26.4	31	....	....	31
Whooping-cough	575	188	573	647	487	352	371	542	272	496	450.3	530	435	....	95
Diphtheria	1,727	2,167	1,914	1,686	1,262	1,361	1,436	1,970	2,359	1,634	1,751.6	2,062	1,555	....	507
Typhoid fever, including typho-malarial fever	433	421	364	397	352	384	400	381	326	322	378.0	445	297	....	148
Diarrheal diseases	3,494	3,762	3,429	3,648	3,346	3,587	3,602	3,310	3,040	3,208	3,448.6	4,059	2,874	....	1,185
Cancer	779	832	870	848	954	902	996	993	1,022	1,030	922.6	1,086	1,141	55	....
* Phthisis and other tuberculous diseases	6,349	6,007	6,063	6,041	6,409	6,109	6,061	6,163	5,720	6,283	6,120.5	7,204	5,926	....	1,278
Premature birth	732	771	670	729	744	799	776	722	805	813	756.1	890	873	....	17
Diseases of the nervous system	3,081	3,373	3,529	3,491	3,210	3,342	3,655	3,751	3,465	3,429	3,432.6	4,040	3,359	....	681
Diseases of the circulatory system	2,021	2,113	2,209	2,128	2,139	2,454	2,507	2,585	2,363	2,488	2,300.7	2,708	2,567	....	141
Diseases of the respiratory system, including croup	7,504	6,873	7,314	6,973	8,353	9,283	9,242	9,676	7,410	8,514	8,114.2	9,550	7,452	....	2,098
Diseases of the urinary system	2,433	2,643	2,495	2,578	2,592	2,696	2,543	2,771	2,659	2,901	2,631.1	3,097	2,903	....	194
Childbirth and puerperal fever	371	355	442	393	383	420	417	384	358	409	393.2	463	416	....	47
Accident	1,276	1,288	1,085	1,148	1,449	1,597	1,900	1,607	1,728	2,045	1,502.3	1,768	2,641	873	....
Homicide	63	70	57	72	61	56	38	47	61	76	60.1	71	71	....	....
Suicide	223	235	247	244	239	300	241	314	331	376	275.0	324	384	60	....
All other causes	5,306	6,380	6,817	6,943	6,983	8,131	8,280	8,024	7,977	8,125	7,290.6	8,587	7,611	....	970
Total	37,351	38,933	40,175	39,679	40,103	43,659	44,432	44,486	41,175	43,420	41,341.3	48,658	41,622	988	8,024
Balance	....	...	....	....	....	....	....	....	....	....	......	....	....	....	7,036

* In 1886 and 1887 tabes mesenterica and marasmus are excluded, hydrocephalus and tubercular meningitis included.

The table thus shows a saving of 7,036 lives of persons in 1896, who would have died during the year if the mortality had been equal to the average annual mortality for the previous ten years.

Ages of Bridegrooms and Brides during Year ending December 31, 1896.

AGES OF BRIDEGROOMS—YEARS.	AGES OF BRIDES—YEARS.																		
	15	16	17	18	19	20	21 to 25	25 to 30	30 to 35	35 to 40	40 to 45	45 to 50	50 to 55	55 to 60	60 to 65	65 to 70	70 to 75	Unspecified.	Total Bridegrooms.
17	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1
18	..	1	1	11	3	3	6	1	..	..	..	..	..	..	..	..	..	..	26
19	..	6	10	38	29	18	20	5	..	..	..	..	..	..	..	..	..	..	126
20	..	5	16	90	78	92	57	10	..	1	..	..	..	..	..	..	..	..	349
21 to 25	2	10	83	807	981	1,309	2,761	481	58	16	6	..	..	1	..	..	..	2	6,517
25 to 30	2	12	67	445	484	878	2,091	1,817	309	67	14	3	..	..	..	..	..	7	7,096
30 to 35	..	1	6	60	118	174	974	1,039	501	158	32	6	1	1	..	..	..	8	3,079
35 to 40	..	..	5	8	25	55	286	402	341	226	76	13	4	..	..	..	..	2	1,533
40 to 45	..	..	..	2	7	11	85	187	166	146	90	31	3	4	..	..	..	..	732
45 to 50	..	..	..	1	2	6	28	68	93	124	71	61	8	7	1	..	..	..	470
50 to 55	..	..	..	1	1	3	9	24	34	52	72	52	20	6	1	1	..	..	276
55 to 60	..	..	..	1	1	1	4	8	17	21	31	33	16	15	1	..	..	..	149
60 to 65	..	..	..	..	..	1	3	4	4	12	15	19	8	6	2	..	..	..	74
65 to 70	..	..	..	..	..	..	1	3	1	7	6	5	7	4	8	2	..	..	44
70 to 75	..	..	..	..	..	..	..	..	2	1	4	1	1	..	2	1	1	..	13
75 to 80	..	..	..	..	..	..	..	..	1	1	1	..	..	1	..	1	..	..	5
80 and up	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	1
Unspecified	..	..	..	..	1	..	1	1	..	..	..	..	..	..	..	..	..	19	22
Total Brides	4	35	189	1,464	1,730	2,551	7,226	4,140	1,527	832	419	224	68	45	15	5	1	38	20,513

Former Condition of Persons Married.

	JAN.	FEB.	MAR.	APRIL.	MAY.	JUNE.	JULY.	AUG.	SEPT.	OCT.	NOV.	DEC.	TOTAL.
Bachelors and spinsters	1,618	1,492	1,204	1,417	1,195	1,786	1,156	1,112	1,179	1,599	1,566	1,550	16,874
Bachelors and widows	102	89	63	84	87	112	89	91	76	107	95	80	1,075
Widowers and spinsters	125	111	88	119	95	140	103	105	114	166	139	112	1,417
Widowers and widows	83	69	65	81	72	87	88	59	72	101	97	104	978
Unknown (one or both)	....	....	....	....	....	3	5	....	....	1	....	....	9
Divorced (one or both)	15	12	9	21	15	19	14	11	7	15	12	10	160
Total	1,943	1,773	1,429	1,722	1,464	2,147	1,455	1,378	1,448	1,989	1,909	1,856	20,513

* *Marriages, by Months, for Year 1896, Showing Sex, Color, Previous Condition and Nativity.*

MONTHS.	TOTAL.	WHITE.		COLORED.		SINGLE.		WIDOWED.		NATIVE.		FOREIGN.	
		M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
January	1,943	1,905	1,909	38	34	1,732	1,748	211	195	689	791	1,254	1,152
February	1,773	1,748	1,750	25	23	1,583	1,610	190	163	671	739	1,102	1,034
March	1,429	1,370	1,371	59	58	1,270	1,292	159	137	454	525	975	904
April	1,722	1,693	1,693	29	29	1,508	1,548	214	174	732	779	990	943
May	1,464	1,441	1,442	23	22	1,290	1,296	168	168	514	567	950	897
June	2,147	2,108	2,109	39	38	1,912	1,937	235	210	830	919	1,317	1,228
July	1,455	1,409	1,413	46	42	1,264	1,277	191	178	551	589	904	866
August	1,378	1,354	1,356	24	22	1,207	1,226	171	152	464	511	914	867
September	1,448	1,416	1,416	32	32	1,262	1,305	186	143	599	666	849	782
October	1,989	1,946	1,946	43	43	1,718	1,783	271	206	842	895	1,147	1,094
November	1,909	1,865	1,870	44	39	1,675	1,716	234	193	720	756	1,189	1,153
December	1,856	1,805	1,806	51	50	1,637	1,678	219	178	682	758	1,174	1,098
Total	20,513	20,060	20,081	453	432	18,064	18,416	2,449	2,097	7,748	8,495	12,765	12,018

* 11 Chinese bridegrooms and white brides.
1 Chinese bridegroom and Chinese bride.
1 Japanese bridegroom and white bride.
1 Japanese bridegroom and Japanese bride.
1 White bridegroom and Japanese bride.
2 White bridegrooms and colored brides.
18 Colored bridegrooms and white brides.

Births Reported during Year 1896, according to Nativity of Parents, by Wards.

WARDS.	BIRTH-PLACE OF BOTH PARENTS.						BIRTH-PLACE OF MOTHER ONLY.						TOTAL.
	United States.	Germany.	Ireland.	Italy.	Russian Poland.	Others.	United States.	Germany.	Ireland.	Italy.	Russian Poland.	Others.	
First	111	35	67	15	7	13	41	10	12	2	..	10	323
Second	2	1	2	3	....	1	1	2	....	..	..	....	12
Third	6	3	6	4	2	....	4	2	....	..	..	1	28
Fourth	48	10	15	137	41	9	20	2	6	5	2	4	299
Fifth	47	12	56	57	5	11	26	3	8	2	..	8	235
Sixth	36	6	10	448	83	29	26	3	2	7	4	6	660
Seventh	278	36	106	322	1,717	94	119	13	29	5	32	59	2,810
Eighth	127	31	87	367	24	26	66	9	12	4	..	15	768
Ninth	770	147	354	162	120	113	238	41	107	1	3	110	2,166
Tenth	108	50	11	78	2,219	537	58	31	9	5	61	125	3,292
Eleventh	261	163	35	33	554	1,104	127	40	17	1	29	168	2,532
Twelfth	3,389	1,372	975	860	363	808	1,210	318	420	12	32	532	10,291
Thirteenth	209	74	38	99	1,490	1,246	94	36	13	5	43	213	3,560
Fourteenth	75	8	20	1,023	39	19	23	5	8	6	..	8	1,234
Fifteenth	116	52	23	248	16	41	55	12	11	5	1	14	594
Sixteenth	474	106	230	36	21	74	146	12	74	4	1	78	1,256
Seventeenth	840	613	108	277	943	1,087	360	172	50	2	66	267	4,785
Eighteenth	541	229	240	101	69	153	216	69	102	6	8	79	1,813
Nineteenth	1,708	1,109	820	250	245	1,186	867	281	332	7	28	431	7,264
Twentieth	880	285	382	109	50	258	274	54	167	5	5	148	2,617
Twenty-first	370	104	233	77	44	134	141	32	105	2	9	103	1,354
Twenty-second	1,641	490	861	129	56	228	533	119	273	3	10	281	4,624
Twenty-third	901	348	160	154	34	138	271	71	76	1	2	100	2,256
Twenty-fourth	327	80	41	63	35	52	94	23	32	2	5	29	783
Not stated	10	3	2	13	2	15	15	1	2	..	..	4	67
Total	13,275	5,367	4,882	5,065	8,179	7,376	5,025	1,361	1,867	92	341	2,793	55,623

Table of Births Reported by Months for the Year 1896, Showing Color, Nativity of Parents, Number Reported by Physicians and Midwives, Illegitimate and Twin Births.

MONTHS.	TOTAL.	WHITE.		COLORED.		NATIVITY OF PARENTS.								BIRTHS REPORTED BY		Births Apparently Illegitimate.	Pairs of Twins Reported.
						NATIVE.		FOREIGN.		MIXED.		UNKNOWN.					
		Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	Physicians.	Midwives.		
January	4,694	2,329	2,312	29	24	531	559	1,515	1,428	283	316	29	33	2,293	2,401	77	34
February	4,547	2,230	2,242	40	35	551	516	1,381	1,460	303	265	35	36	2,489	2,058	107	42
March	4,862	2,495	2,310	30	27	570	562	1,590	1,441	341	311	24	23	2,582	2,280	69	41
April	4,413	2,174	2,173	37	29	514	535	1,331	1,368	337	273	29	26	2,388	2,025	81	39
May	4,169	2,047	2,069	22	31	520	563	1,229	1,215	285	292	35	30	2,318	1,851	57	37
June	4,246	2,183	2,005	32	26	550	518	1,297	1,209	329	274	39	30	2,420	1,826	84	32
July	4,741	2,362	2,300	43	36	606	577	1,415	1,398	350	316	34	45	2,642	2,099	127	32
August	4,684	2,360	2,247	39	38	605	552	1,434	1,390	344	319	16	24	2,546	2,138	91	29
September	4,792	2,435	2,318	17	22	578	521	1,549	1,464	307	334	18	21	2,772	2,020	81	31
October	4,929	2,407	2,461	33	28	592	552	1,510	1,591	321	328	17	18	2,621	2,308	88	33
November	4,446	2,225	2,159	28	34	531	496	1,382	1,377	319	295	21	25	2,477	1,969	78	31
December	5,100	2,614	2,415	33	38	598	578	1,672	1,517	347	335	30	23	2,736	2,364	112	38
Total	55,623	27,861	27,011	383	368	6,746	6,529	17,305	16,858	3,866	3,658	327	334	30,284	25,339	1,092	419

stimated Population, Deaths, Births and Marriages, from 1790 *to* 1896, *Inclusive.*

YEAR.	Population.	Deaths.	‡Births.	‡Marriages.	YEAR.	Population.	Deaths.	‡Births.	‡Marriages.
....	32,962	....	....	....	1844..............	358,902	8,890	....	....
....	35,009	....	....	....	1845..............	371,223	10,122	....	....
....	37,182	....	....	....	1846........... ...	396,686	11,411	....	....
....	39,491	....	....	....	1847*..............	423,896	14,844	317	185
....	41,943	....	....	....	1848..............	452,972	14,892	170	199
....	44,548	....	....	....	1849..............	484,043	22,605	....	....
....	47,314	....	....	....	1850..............	517,246	15,826	....	....
....	50,252	....	....	....	1851..............	538,490	20,738	....	....
....	53,372	....	....	....	1852..............	560,607	20,196	....	....
....	56,686	....	....	....	1853†..............	583,632	21,979	10,157	3,203
....	60,206	....	....	....	1854...	607,603	28,473	17,979	5,595
....	63,081	....	....	....	1855..............	632,559	24,448	14,145	4,199
....	66,094	....	....	....	1856..............	664,980	21,748	16,199	3,633
....	69,250	....	....	....	1857..............	699,062	22,811	18,427	3,710
....	72,557	2,084	....	....	1858..............	734,892	23,269	13,340	3,942
....	76,022	2,297	....	....	1859..............	772,558	22,745	9,035	3,100
....	79,653	2,174	....	....	1860..............	812,154	24,760	12,454	4,241
....	83,456	2,236	....	....	1861..............	794,905	24,525	10,004	2,993
....	87,442	1,950	....	....	1862..............	778,023	23,150	7,612	2,896
....	91,618	2,038	....	....	1863..............	761,500	26,617	6,426	3,272
....	95,993	2,073	....	....	1864..............	745,327	25,792	5,877	2,675
....	95,957	2,431	....	....	1865..............	729,498	25,767	5,332	2,733
....	95,920	2,503	....	....	1866..............	767,979	26,815	10,006	5,792
....	95,884	2,335	....	....	1867..............	808,489	23,159	12,535	7,144
....	95,848	1,884	....	....	1868..............	851,137	24,889	12,590	6,926
....	99,952	2,511	....	....	1869..............	896,034	25,167	13,947	8,695
....	104,232	3,000	....	....	1870..............	943,300	27,175	14,524	7,985
....	108,695	2,409	....	....	1871..............	955,921	26,976	20,821	8,646
....	113,350	3,106	....	....	1872..............	968,710	32,647	22,068	9,008
....	118,204	3,178	....	....	1873..............	981,671	29,084	22,683	8,871
....	123,266	3,522	....	....	1874..............	1,030,607	28,727	25,747	8,397
....	130,840	3,422	....	....	1875..............	1,044,396	30,709	23,813	7,565
....	138,879	3,212	....	....	1876..............	1,075,532	29,152	23,744	7,099
....	147,413	3,551	....	....	1877..............	1,107,597	26,203	25,569	7,129
....	156,471	4,224	....	....	1878..............	1,140,617	27,008	25,729	7,629
....	166,086	4,920	....	....	1879..............	1,174,621	28,342	25,573	8,446
....	172,978	4,961	....	....	1880..............	1,209,196	31,937	27,536	9,002
....	180,157	5,139	....	....	1881..............	1,244,511	38,624	26,130	10,077
....	187,634	4,843	....	....	1882..............	1,280,857	37,924	27,321	11,085
....	195,421	4,734	....	....	1883..............	1,318,264	34,011	28,972	11,556
....	203,532	5,522	....	....	1884..............	1,356,764	35,034	30,527	11,605
....	215,381	6,347	....	....	1885..............	1,396,388	35,682	30,030	11,716
....	227,920	10,257	....	....	1886..............	1,437,170	37,351	31,319	12,216
....	241,188	5,689	....	....	1887...	1,479,143	38,933	34,023	13,740
....	255,230	8,907	....	....	1888..............	1,522,341	40,175	36,136	14,533
....	270,089	7,096	....	....	1889..............	1,566,801	39,679	37,527	14,400
....	278,275	8,068	....	....	1890..............	1,612,559	40,103	39,250	14,992
....	286,719	8,626	....	....	1891..............	1,659,654	43,659	46,904	15,764
....	295,400	7,911	....	....	1892..............	1,708,124	44,329	49,447	16,001
....	304,353	7,910	....	....	1893..............	1,758,010	44,486	51,529	16,144
....	313,578	8,469	....	....	1894..............	1,809,353	41,175	55,636	17,388
....	324,342	9,093	....	....	1895..............	1,879,195	43,420	53,731	20,612
....	335,475	9,154	....	....	1896..............	1,934,077	41,622	55,623	20,513
....	346,991	8,659	....	....					

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irst year of registration of Births and Marriages.
irths and Marriages from July 1 to December 2.
ıcomplete.

Annual Number of Deaths from Prominent Causes

Causes of Death.	1866.	1867.	1868.	1869.	1870.	1871.	1872.	1873.	1874.	1875.	1876.	1877.	1878.	1879.
Cerebro-spinal Meningitis..	18	33	34	42	32	48	782	290	158	146	127	116	97	108
Diphtheria.......	435	250	277	328	308	238	446	1,151	1,665	2,329	1,750	951	1,007	671
Typhoid Fever †.	514	347	329	378	422	251	386	313	305	376	325	343	321	268
Malarial Fevers..	175	173	132	128	213	279	326	263	265	246	195	250	285	300
Measles	153	499	200	526	298	409	463	306	319	167	362	155	272	244
Scarlet fever.....	806	655	861	966	975	791	990	1,045	879	514	891	983	1,099	1,477
Small-pox‡	44	19	26	203	293	805	929	117	484	1,280	315	14	2	25
Typhus Fever...	433	169	137	125	96	65	86	39	14	28	20	17	4	4
Whooping-cough	114	155	217	358	201	465	565	268	489	407	406	440	382	537
Diarrheal Diseases	4,880	3,139	3,837	3,134	3,956	3,653	5,197	4,097	3,569	3,738	3,782	3,557	2,945	2,965
Diarrheal Diseases under 5 years.......	2,856	2,590	3,322	2,676	3,511	3,250	4,680	3,634	3,227	3,352	3,413	3,187	2,598	2,592
Cancer..........	269	293	315	304	355	335	392	425	416	424	459	495	570	572
Heart Diseases..	680	664	615	686	699	813	894	860	883	985	992	880	1,068	1,164
All diseases of the Nervous System ‖	3,876	3,260	3,560	2,976	3,275	2,677	3,479	2,811	2,451	2,436	2,663	2,378	2,410	2,486
Bronchitis.......	557	695	803	877	855	964	1,040	1,058	1,065	1,111	1,214	1,033	1,184	1,263
Croup...........	368	333	342	483	421	466	675	732	594	758	527	472	499	521
Phthisis.........	3,481	3,256	3,414	3,364	4,030	4,186	4,274	4,134	4,034	4,172	4,194	4,044	4,466	4,343
Pneumonia......	1,388	1,434	1,668	2,100	1,836	1,834	2,150	2,328	2,398	2,802	2,542	2,148	2,288	2,554
Bright's Disease.	412	403	534	557	787	947	949	876	828	909	958	923	919	1,027
Puerperal Fever.	130	63	101	108	150	193	284	258	232	222	190	185	172	216
Other Puerperal Diseases	93	119	121	116	128	188	192	169	161	148	152	113	128	143
Sunstroke.......	310	5	196	26	238	21	320	34	19	19	206	21	52	41
Accidents.......	884	635	733	797	834	*1,071	1,108	968	1,008	967	902	820	809	837
Homicide	18	29	46	37	45	65	69	73	59	62	55	57	58	48
Suicide	54	82	96	102	101	114	144	118	180	155	150	148	142	117

* Exclusive of 53 killed in riot July 12.

† Inclusive of Typho-Malarial Fever.

‡ The Vaccinating Corps was organized as a separate branch of the Department on September 29, 1874 in accordance with chapter 635, Laws of 1874, passed June 15.

hirty-one Years Ending December 31, 1896.

1881.	1882.	1883.	1884.	1885.	1886.	1887.	1888.	1889.	1890.	1891.	1892.	1893.	1894.	1895.	1896.
461	238	223	210	202	223	203	173	145	136	189	230	469	213	204	178
2,249	1,525	1,009	1,090	1,325	1,727	2,167	1,914	1,686	1,262	1,361	1,436	1,970	2,359	1,634	1,555
594	516	625	476	405	433	421	364	397	352	384	400	381	326	322	297
457	386	371	308	297	286	250	270	223	176	185	161	133	126	90	112
429	913	716	762	736	668	767	591	470	730	663	864	393	584	793	714
1,964	2,066	744	608	559	371	589	1,361	1,242	408	1,220	977	551	541	468	402
451	259	12	....	26	31	99	81	1	2	2	81	102	154	10	1
160	65	15	27	15	14	....	4	....	....	1	45	200	....	....	....
286	658	327	490	495	575	188	573	647	487	352	371	542	272	496	435
4,270	4,050	3,398	3,679	3,426	3,494	3,762	3,489	3,648	3,346	3,587	3,602	3,300	3,040	3,208	2,874
3,710	3,479	2,897	3,160	2,892	2,990	3,252	3,051	3,135	2,997	3,191	3,162	2,898	2,708	2,839	2,544
706	732	678	731	754	779	832	870	848	954	902	996	993	1,022	1,030	1,141
1,289	1,477	1,693	1,662	1,800	1,894	2,018	1,880	1,970	1,978	2,285	2,330	2,379	2,170	2,297	2,396
3,274	2,968	2,810	3,018	3,241	3,123	3,589	3,529	3,491	3,210	3,342	3,655	3,751	3,465	3,429	3,359
1,511	1,583	1,435	1,485	1,605	1,701	1,838	1,892	1,814	1,987	1,836	1,754	1,577	1,329	1,636	1,292
1,038	729	644	748	855	968	889	639	605	521	609	670	588	511	342	208
5,312	5,247	5,290	5,235	5,196	5,477	5,260	5,260	5,179	5,492	5,160	5,033	5,124	4,658	5,205	4,994
3,261	3,472	3,409	3,159	3,650	3,656	3,707	4,288	4,075	4,989	5,818	5,841	6,487	4,725	5,751	5,383
1,187	1,241	1,195	1,163	1,188	1,210	1,128	1,147	1,763	2,024	2,116	1,991	2,071	1,879	2,019	2,195
244	236	254	241	213	186	198	246	226	208	249	277	237	193	218	198
182	171	162	197	181	185	157	196	167	175	171	140	147	165	191	218
134	103	83	107	146	42	216	96	32	62	95	320	43	115	85	765
1,059	1,099	1,100	1,055	1,078	1,176	1,288	1,085	1,148	1,449	1,597	1,900	1,607	1,728	2,045	2,641
65	76	62	55	59	63	70	57	72	61	56	38	47	61	76	71
166	199	161	229	207	223	235	247	244	239	300	241	314	331	376	384

Number stated in printed annual report for 1873, 2,702; discrepancy caused by transfer of deaths from simple ro-Spinal Meningitis, from Zymotic to Nervous causes. Sunstroke included from 1866 to 1887, excluded from 1890, inclusive.

Cases of Contagious and Infectious Diseases Reported from 1874 *to* 1896, ***inclusive.***

YEAR.	CROUP.	DIPHTHERIA.	MEASLES.	SCARLET FEVER.	SMALL-POX.	TYPHOID FEVER.	TYPHUS FEVER.*	TOTAL.
1874......	....	3,684	1,407	3,051	1,462	488	48	10,140
1875......	....	4,521	703	1,730	3,397	634	56	11,041
1876......	....	3,471	1,638	2,406	883	561	15	8,974
1877......	....	2,328	1,719	3,475	46	607	15	8,192
1878......	....	3,484	2,172	3,916	5	594	10	9,181
1879......	....	1,783	2,333	5,446	65	432	8	10,067
1880......	....	3,307	3,891	3,048	64	508	2	10,820
1881......	....	5,196	3,076	7,164	1,338	901	603	18,278
1882......	....	3,507	4,637	5,961	702	686	207	15,700
1883......	....	2,096	3,828	3,825	26	1,393	71	11,239
1884......	....	2,223	4,395	3,262	5	1,102	133	11,120
1885......	....	2,920	4,095	2,634	98	974	84	10,805
1886......	....	3,737	5,028	1,696	109	896	66	11,532
1887......	....	5,923	6,062	3,147	343	1,004	2	16,481
1888......	....	6,491	7,279	7,188	311	1,108	4	22,381
1889......	....	6,489	6,443	8,849	2	1,414	..	23,197
1890......	....	4,350	9,544	3,087	5	1,100	4	18,090
1891......	490	4,874	11,980	7,442	21	1,342	9	26,158
1892......	530	4,654	12,780	7,048	378	1,140	241	26,771
1893......	553	6,468	7,122	5,764	464	1,008	473	21,852
1894......	486	9,155	9,493	4,768	770	792	..	25,464
1895......	428	9,925	8,203	3,808	41	965	..	23,370
1896......	306	11,093	11,850	4,728	5	1,002	3	28,067
Total...	2,793	110,679	129,678	103,443	10,542	20,651	2,054	379,840

Table of Maximum, Minimum and Mean Temperature and Rainfall in the Vicinity of New York City, at Fort Columbus from 1822 *to* 1854; *Deaf and Dumb Asylum from* 1855 *to* 1868 ***and*** *New York Observatory, Central Park, from* 1869 *to date.*

(Figures furnished by DANIEL DRAPER, Ph. D., Director of Central Park Observatory.)

YEAR.	TEMPERATURE—FAHR.					RAINFALL, IN INCHES (INCLUDING SNOW WATER).					
	Maximum.	Month.	Minimum.	Month.	Mean.	Maximum.	Month.	Minimum.	Month.	Total.	Depth of Snow. (Inches.)
1822.......	100	July....	—1	Jan.....	54.2	....	....	....	....	....	....
1823.......	91	"	3	Feb... Mar..	50.5	....	....	....	....	....	....
1824.......	96	"	2	Feb....	52.1	....	....	....	....	....	....
1825.......	104	"	—3	Dec ...	54.4	....	....	....	....	....	....
1826.......	97	"	—1	Jan.	52.5	....	....	....	....	....	....
1827......	96	"	0	"	51.8	....	....	....	....	....	....
1828.......	99	"	9	"	54.	....	....	...	....	....	....
1829.......	95	"	7	"	52.5	....	....	....	....	....	....
1830.......	98	"	5	"	54.8	....	....	....	....	....	....
1831.......	98	Aug....	8	"	51.6	....	....	....	....	....	....
1832.......	97	"	1	"	51.5	....	....	....	....	....	....
1833.......	94	July....	8	March..	51.5	....	....	....	....	....	....
1834.......	94	July.. Aug..	6	Dec. ...	51.	....	....	....	....	....	....
1835.......	89	July.. Aug..	—1	Jan.	49.6	....	....	....	....	....	....
1836.......	89	July.. Sept..	0	Feb	47.6	6.46	June....	.63	May ...	27.57	....
1837.......	86	July.. Aug..	10	Jan... Feb..	49.1	9.50	May ...	2.10	Sept....	65.51	....
1838.......	94	July.. Aug..	13	Feb. ...	50.3	4.96	Sept....	1.83	July ...	41.90	....
1839.......	86	July....	6	Jan	51.2	7.61	Dec	.69	Jan	42.97	....
1840.......	91	June....	2	"	51.2	4.59	Oct.....	1.00	Dec. ...	29.80	....
1841.......	92	"	9	"	51.2	5.30	Jan.....	.80	Feb.. ..	42.08	....

YEAR.	TEMPERATURE—FAHR.					RAINFALL, IN INCHES (INCLUDING SNOW WATER).					Depth of Snow. (Inches.)
	Maximum.	Month.	Minimum.	Month.	Mean.	Maximum.	Month.	Minimum.	Month.	Total.	
1842.......	85	July.. Sept..	16	Jan... Feb...	53.4	4.30	Oct.....	1.07	Jan.....	33.98	....
1843.......	93	June.. July..	9	Feb.....	51.4	15.26	Aug....	.76	June....	41.37	....
1844.......	92	June....	3	Jan.....	52.	6.	July....	.55	April...	36.38	....
1845.......	99	July....	6	Feb.....	53.3	4.87	Jan.....	1.22	" ...	34.08	....
1846.......	95	"	5	"	52.3	9.70	May....	.48	Sept....	48.91	....
1847.......	94	June....	12	Feb... Nov.. Dec..	52.3	6.93	Aug....	1.53	April...	64.85	....
1848.......	91	June.. July..	3	Jan.....	52.3	7.28	May....	1.16	" ...	36.80	....
1849.......	94	July....	0	"	50.2	5.63	Oct.....	.61	Jan.....	31.74	....
1850.......	94	"	9	Feb....	50.9	9.20	May....	2.33	Nov....	54.53	....
1851.......	93	"	4	Dec....	52.1	6.94	April...	.90	June....	40.88	....
1852.......	93	"	—2	Jan.....	51.4	6.20	Aug....	2.06	Oct.....	43.84	....
1853.......	98	June....	9	"	52.2	6.80	Nov....	1.04	Dec. ...	52.20	....
1854.......	93	July....	5	Dec....	50.7	8.80	April...	.70	Mar....	45.18	....
1855.......	93	"	—7	Feb....	50.7	7.37	Oct.....	1.57	Sept....	51.76	....
1856.......	95	"	—5	Jan.....	50.5	6.73	Aug....	.66	Feb....	41.92	....
1857.......	90	Aug....	0	"	52.1	9.05	April...	1.30	Nov....	53.88	....
1858.......	93	June....	—3	Feb....	53.1	6.42	June....	1.47	Mar....	52.87	....
1859.......	96	July....	—5	Jan.....	53.1	8.21	Mar....	1.75	Oct.....	57.28	....
1860.......	89	"	—7	Feb....	52.9	7.57	Nov....	1.43	June....	45.17	....
1861.......	92	Aug....	—3	"	53.8	8.09	"	1.73	Dec. ...	56.52	....
1862.......	95	"	8	Dec. ...	53.2	9.03	June....	1.91	"	53.98	....
1863.......	90	June....	6	Feb....	54.2	8.60	July....	1.05	Sept....	57.03	....
1864.......	97	"	8	"	55.4	5.90	Dec....	2.04	Feb....	48.01	....
1865.......	95	July....	6	Jan.....	55.5	10.42	June....	2.23	Aug....	62.86	....
1866.......	98	"	—13	"	52.1	10.09	Feb....	1.67	July....	51.68	....
1867.......	91	June....	4	"	49.8	10.18	June....	.78	Sept....	54.61	....
1868......	92	July....	0	Feb. ...	48.6	9.60	Sept....	2.01	Oct.....	64.02	....
1869.......	94	Aug....	4	Mar. ...	51.4	6.87	Feb	1.39	April...	46.47	30.67
1870.......	94	June....	9	Feb... Dec..	53.5	5.11	April...	1.83	May....	42.12	25.49
1871.......	92	May ...	—2	Dec....	51.1	7.50	Oct.....	2.07	Jan.....	51.26	34.22
1872.......	95	July....	3	Mar.. Dec..	51.0	7.83	July....	1.29	Feb. ...	42.49	40.37
1873.......	94	"	—1	Jan .. Feb ..	52.9	9.56	Aug ...	1.28	June....	47.99	40.93
1874.......	98	June....	3	Feb	51.3	8.77	April...	1.70	Oct	45.63	35.62
1875.......	93	"	—3	Jan	49.4	8.97	Aug. ..	1.33	May ...	40.90	48.25
1876.......	98	July....	3	Dec	51.8	8.79	Mar....	.94	Jan	41.77	30.74
1877.......	92	"	10	Mar. ..	52.7	8.14	Oct	.68	Dec. ...	40.18	27.37
1878.......	94	"	7	Jan .. Feb...	53.5	7.97	Aug....	1.97	April...	48.66	13.74
1879.......	98	"	—4	Jan	52.3	7.95	"	.43	Oct	39.03	37.62
1880.......	96	May....	—6	Dec. ...	53.2	8.53	July....	.62	May ...	36.64	27.02
1881.......	101	Sept ...	—3	Feb	52.3	5.81	Mar....	.86	Aug ...	36.20	23.75
1882.......	93	July....	—5	Jan	51.9	16.85	Sept ...	1.14	"	45.30	20.14
1883.......	95	"	—1	Dec...	50.4	4.53	Oct.....	1.49	Mar....	35.77	52.50
1884.......	91	June . Aug.. Sept..	—3	"	52.4	6.17	Dec. ...	.21	Sept....	52.25	31.50
1885.......	99	July....	—2	Feb	51.1	5.67	Aug ...	.41	"	38.34	23.23
1886.......	94	"	—4	"	51.0	5.40	May ...	.95	Aug ...	39.38	31.00
1887.......	96	"	4	Jan	50.9	7.76	June....	.34	May....	43.99	31.87
1888.......	96	June ...	0	"	49.3	8.16	Sept....	1.53	July....	53.32	37.75
1889.......	91	May.. June .	3	Feb. ...	52.7	11.89	July....	1.10	Dec....	57.16	21.00
1890.......	98	July....	7	Mar ...	52.7	6.56	Oct	.71	Nov....	45.63	29.63
1891.......	98	Aug....	9	" ...	53.8	6.12	Jan	1.48	June ...	39.55	17.37
1892.......	97	July....	9	Jan	51.8	7.14	Nov ...	.59	Oct	35.60	34.63
1893.......	95	June ...	1	"	50.4	8.72	Aug ...	1.13	July....	48.26	45.62
1894.......	96	July....	1	Feb. ...	52.7	8.68	Sept ...	.98	June ...	41.01	35.25
1895.......	97	Sept ...	—4	"	52.6	5.01	Jan	.46	Feb	35.27	22.75
1896.......	98	Aug ...	—5	"	53.4	7.41	July ...	.96	Jan	41.96	64.00

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